

APPLICATION COVER PAGE – 1 OF 2 (PROJECT BASIC CRITERIA)

Section 1: Application Cover Page; Basic Criteria

Please use this page, or re-create as is.

1. **PROJECT TYPE:** *(As mandated by the RESTORE Act, funds may only be used for one or more of the allowable uses listed below, which the County cannot amend or change. Carefully review each criteria listed below and determine if your project will achieve one or more of the allowable uses below. Projects that do not meet at least one of the allowable uses below will not be considered for funding. Check all that apply.)*

- ☐ Restoration and protection of natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast Region.
- ☐ Mitigation of damage to fish, wildlife, and natural resources.
- ☐ Implementation of a federally approved marine/coastal management plan, including fisheries monitoring.
- ☐ Workforce development and job creation.
- ☐ Improvements to or on state parks in coastal areas affected by the Deepwater Horizon oil spill.
- ☐ Infrastructure projects benefitting economy or ecological resources, including port infrastructure.
- ☐ Coastal flood protection and related infrastructure.
- ☐ Planning assistance.
- ☐ Activities to promote tourism and seafood in the Gulf Coast region, for one or more of the following:
 - ☐ Promotion of tourism in the Gulf Region, including recreational fishing.
 - ☐ Promotion of the consumption of seafood harvested from the Gulf Coast region.

2. **CONTACT INFORMATION:** *(Include at least one name, phone number, email address, and organization name if applicable)*

- Organization:
- Address:
- City, State, Zip Code:
- Contact Person
 - Name:
 - Title:
 - Phone:
 - Email Address:

APPLICATION COVER PAGE – 2 OF 2 (PROJECT SUMMARY)

Section 2. Application Cover Page; Project Summary Information

Please utilize this sheet or re-create, but keep format as is.

3. Project Name: *(Provide a short, succinct title for the project)*

4. Project Executive Summary: *(Provide a concise summary or abstract in the space below; do not exceed the space below.)*

5. Range of Benefit: Does this project have a

- ☐ Local benefit?
- ☐ Keys-wide benefit?
- ☐ Regional benefit?
- ☐ Gulf-wide benefit?

(Provide the location of the project and a brief description of the area that is benefiting; do not exceed the space below.)

6. Project Cost: *(Provide the actual/estimated project cost, the amount being requested with this submission, and the amount of match committed to the project from any source. Please make clear the total project cost and the amount you are requesting. There is an opportunity to provide detailed cost/request/match information in the narrative section (see question 8.)*

- | | | |
|-------------------------------------------------------------------|----------|--------------------------|
| • Total Project Cost: | \$ _____ | |
| • RESTORE Request Amount: | \$ _____ | % of project cost: _____ |
| • Secured Cash Match (committed funding from other sources): | \$ _____ | % of project cost: _____ |
| • In-kind Match value: | \$ _____ | % of project cost: _____ |
| • Funding Gap: | \$ _____ | % of project cost: _____ |
| • Anticipated Cash Match (potential funding from other sources)*: | \$ _____ | % of project cost: _____ |

**These funds must be secured within 1 year of project award.*

APPLICATION PROJECT BUDGET

Section 3. Project Budget

PROJECT BUDGET		FUNDING		
Activity/ Item	Cost	Anticipated RESTORE Funding	Cash Match	In-kind Match
Planning/Design/Permitting				
Administration*:				
Planning Subtotal:				
Construction or Project Activity(ies)				
Administration*:				
Construction Subtotal:				
Monitoring				
Administration*:				
Monitoring Subtotal:				
Project Cost				
Total Administration*:				
TOTAL Project Cost:				

Estimated Costs by Year	
Year 1	
Year 2	
Year 3	
Year 4	
Year 5	
Year 6	

*Notes: Only complete the sections of the budget that are applicable for your project. Please refer to question 8 to provide further explanation of budget details. *The RESTORE Act places a total 3% cap on administrative expenses. We are uncertain at this point how this will be applied, how "administration" will be defined or assigned, or whether projects may even be able to include administration. We are waiting on further guidance from US Treasury rules to define this. Please keep this in mind as you develop your budget. Administrative costs typically include but may not be limited to overhead costs for basic operational functions (insurance, utilities), as well as costs associated with admin staff such as accountants, legal, etc.*

7. Project Description: (Describe all aspects of the project; what issue, need, concern or problem does the project address? Why is the issue/need/concern/problem important? Is there an urgency or immediacy to the need? Provide facts and data sources used to support the need for this project. What and/or who does the project impact, benefit or affect; what will it accomplish when completed? Provide facts and data sources to support the expected impacts. Provide any other relevant information needed to describe your project. Be sure you make the connection between your project and the RESTORE Act criteria selected on first page. Provide citations for all references quoted or used to support the need for and impacts of this project.)

Maximum 20 pts. How important is this project in terms of the need it meets and the goals it is seeking to achieve? How critical is the need it addresses? Is the need supported by data/facts? Is this project likely to meet its goals? Is the project approach organized and well thought out?

Project Need. Coral habitats in the Keys have been in decline since the 1970s, due to multiple stressors including coral bleaching, disease outbreaks, hurricanes, and cold snaps. Prior to Caribbean-wide coral decline, many reef areas displayed a zonation pattern dominated by three hard coral species: elkhorn (*Acropora palmata*), staghorn (*Acropora cervicornis*), and massive star corals of the genus *Montastrea* (Jackson, 1992). These corals provided the framework that is important to other reef-dependent species, including many fish species.

The Florida Keys Coral Reef Evaluation and Monitoring Project (CREMP), started in 1995, has recorded a decline in both species richness and coral cover, and no significant recruitment of juvenile corals since 1996 (Ruzicka et al., 2010). Populations of elkhorn and staghorn coral underwent a region-wide decline starting in the 1980s, with losses of up to 97% in some areas, due mainly to increased prevalence of bleaching and disease. These two species were listed as threatened under the Endangered Species Act in 2006. A more recent decline in the massive star corals have also led to a decline in live coral cover in the Florida Keys (Ruzicka, 2010). As a result, the boulder star coral (*Montastrea annularis*), mountainous star coral (*Montastrea faveolata*), and star coral (*Montastrea franksi*) are currently being considered for listing as endangered, and the two Acroporid species have been proposed for uplisting to endangered.

The loss of reproductively active coral colonies, increased distance between these colonies and low rates of juvenile coral colonies surviving to sexual maturity have combined to create a situation in which it is unlikely that corals in the Florida Keys will repopulate the reefs naturally. This contributes to decreased resilience of our reef system and depresses natural restorative processes. Habitat protection and threat abatement may not be enough to stop the decline of reefs and active restoration of coral populations is quickly becoming a feasible and cost-effective way to reestablish live corals to reefs. See Figure 1.

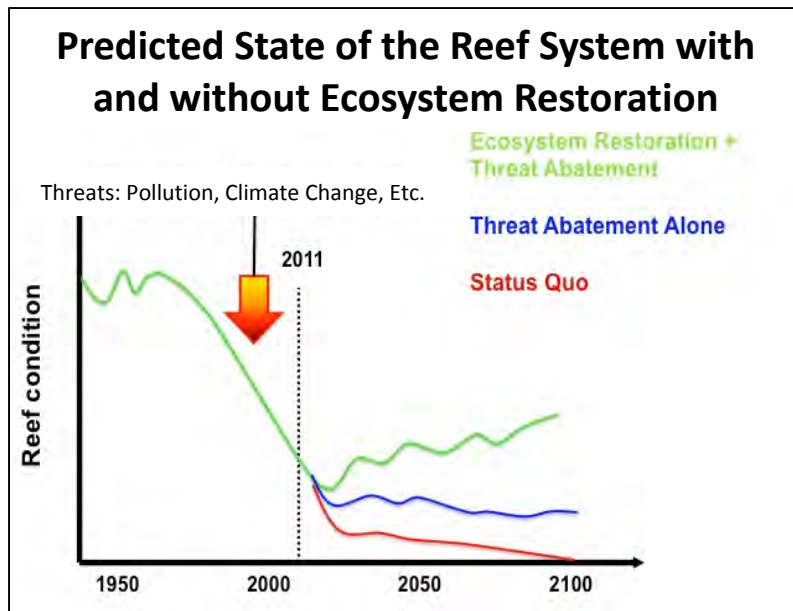


Figure 1. Without large-scale ecosystem restoration, coral reef condition is unlikely to improve.

Restoration of injured or degraded coral reefs was identified as an important strategy in the National Coral Reef Action Strategy, written as a report to Congress about the implementation of the Coral Reef Conservation Act. Objectives under this strategy include developing and testing innovative methods to expedite reef restoration, promoting cost-effective restoration projects, and transferring proven restoration tools, techniques, and lessons learned to domestic and international partners. This project is a strong contributor to the overall habitat restoration component of the National Coral Reef Action Strategy.

Project Description. The proposed project focuses on active restoration of coral populations in Monroe County using two field-tested methods. The first is the propagation of staghorn corals in offshore nurseries to be outplanted into breeding populations on degraded reefs throughout the Keys. The second is the creation of boulder coral colonies in land-based nursery facilities to be used to restore dead coral heads. Both methods increase live coral cover and three dimensional structure at the restoration site and support recovery of reefs region-wide by encouraging successful reproduction.

At least 50,000 staghorn corals of varying sizes will be planted on reefs from Key West to Key Largo as well as in Dry Tortugas National Park (DTNP) over the course of three years. A subset of these will be part of value-added scientific research to help improve future restoration activities in Florida and the Caribbean. An additional 30,000 boulder coral fragments will repair 3,000 dead coral heads using an innovative 'reskinning' technology. These efforts will be designed to encourage the restored corals to reproduce on their own and reseed other reefs. See Appendix 1 for a more detailed description of the work involved.

The Nature Conservancy will administer the grant with a bulk of the funding going towards on-the-ground restoration by Coral Restoration Foundation, Florida Fish and Wildlife Conservation Commission and Mote Marine Laboratory. The Nature Conservancy will also continue nursery

work and outplanting in Dry Tortugas National Park. This partnership is well-established after years of work under TNC and the National Oceanic and Atmospheric Administration's (NOAA) Community-Based Restoration Program (CRP) and American Recovery and Reinvestment Act (ARRA) funding. A more detailed description about how the money will be distributed and what work will be completed by each partner is included in Table 1.

Expected Benefits. Healthy coral reefs provide benefits to marine life and people alike. Reefs provide essential habitat to commercially and recreationally important fish species as well as thousands of species of invertebrates. They also are frequented by larger marine predators such as sharks, sea turtles and dolphins. Because of their high diversity and abundance of marine life, as well as their beauty, reefs attract people for fishing, snorkeling and diving. More than 33,000 jobs in the Keys are supported by ocean recreation and tourism, accounting for more than half of the local economy. Intact reefs also provide a barrier for ocean waves, causing them to break offshore rather than on our shoreline.

Without active restoration efforts Florida Keys reefs are likely to continue to lose live coral cover, and reefs without live coral eventually erode away. The benefits that our reefs are currently providing will be degraded if actions are not taken now to reverse this downward trend.

Budget Narrative/Financial Feasibility/Cost-Effectiveness: (Be sure that your responses to this question and dollar amounts used are consistent with those used in Application Project Budget, and those in Question 6.

- Clearly indicate and describe the estimated or actual costs of the project.
- Clearly indicate and describe the amount and use of RESTORE Act funding request.
- Identify amount and sources for your secured match funding. ["Cash match" is defined as actual cash contributions to project costs. "Secured cash match funding" is funding that has been committed by your project.] Please demonstrate secured match funding with documentation such as commitment letter(s) from the funder(s).
- Identify amount and sources for your anticipated cash match. ["Anticipated cash match" is potential funding you have sought or will seek but is not confirmed.] Please note that an applicant must have its project's "anticipated cash match" secured within one year of award of RESTORE Act funding. Explain, if applicable, how these RESTORE funds may be used to leverage additional funding.
- If your project is also using in-kind match ["In-kind match" is defined as contribution to project costs other than cash], please identify what the in-kind match includes and how you calculated its value.
- Explain how the project is financially feasible [ie, is there a plan to cover all costs?]
- Explain how the project is cost-effective [ie, is this project a good value, is it economical in terms of the tangible benefits produced by the money being spent?]

Maximum 15 pts. Several things will be evaluated with respect to the budget including match value, financial feasibility and cost-effectiveness.

Because this project has been underway for years, the costs associated with propagation and outplanting are well-established. This cost includes the materials, personnel and boat support needed to grow corals in the nurseries, outplant them to reefs and then monitor and perform maintenance on the outplanted corals at least twice to improve their survival and growth rates. With improving economies of scale costs per coral may decrease and if this occurs during the timeframe of the project the number of coral outplanted would increase accordingly. The budget is based on the actual cost of the project at the scale proposed.

RESTORE Act funding will be administered by The Nature Conservancy which will oversee the project subawards and lead coral restoration activities in Dry Tortugas National Park. The bulk of the project funding will provide subawards to Mote Marine Laboratory, Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute and Coral Restoration Foundation, to complete the work that each project partner has committed to (see Table 1).

Table 1. Funding distribution and deliverables for each partner.

Organization	Cost	Deliverables
Coral Restoration Foundation	\$350,000 Restore, \$275,000 match	15,200 small (10-20cm), 3,200 medium (20-50cm), and 1,000 large (50-100cm) corals outplanted
Florida Fish and Wildlife Conservation Commission – Fish and Wildlife Research Institute	\$200,000 Restore, \$200,000 match	7,200 corals outplanted, value-added research projects
Mote Marine Lab – offshore nurseries	\$350,000 Restore, \$185,951 match	15,200 small (10-20cm), 3,200 medium (20-50cm), and 1,000 large (50-100cm) corals outplanted
Mote Marine Lab – land-based nurseries	\$200,000 Restore, \$210,273 match	30,000 microfragments created and outplanted
TNC – Florida Keys	\$100,000 Restore, \$100,000 match	6,000 corals outplanted, project management

All sources of match listed below are documented in commitment letters from our partners that are included as Appendix 1.

Secured cash match:

TNC cash match - \$100,000 update

In-kind match:

Mote Marine Laboratory - \$178,512 for Acropora – Approximately 935 volunteer hours based on the National Value of Volunteer Time estimated in 2011 as \$21.79 per hour; unrecouped indirect costs*

Mote Marine Laboratory - \$200,332 for non-Acropora – Salary for one full-time employee; unrecovered indirect costs*; vessel costs for field nursery and outplanting; approximately 400 volunteer hours based on the National Value of Volunteer Time estimated in 2011 as \$21.79

Florida Fish and Wildlife Conservation Commission - \$200,000 – Salary of one full-time state employee; unrecovered indirect costs*

Coral Restoration Foundation - \$275,000 – Volunteer hours – Approximately 12,421 hours of volunteer time at the 2012 national rate of \$22.14/hr

*Indirect costs are real expenses an organization incurs while conducting a grant-funded project that cannot be specifically itemized in a proposal budget. Examples of typical indirect costs include operation and maintenance of facilities and equipment as well as administrative staffing (i.e. legal counsel, accountants, etc.). Indirect costs are usually included in grant budgets as a percentage of some or all of the direct costs such as project staff, travel, supplies and so forth and this percentage is the indirect cost rate (ICR). The Nature Conservancy, Mote Marine Laboratory and Florida Fish and Wildlife Conservation Commission all have Negotiated Indirect Cost Rate Agreements with the Federal government. The Nature Conservancy's ICR is 15%, and the other project partners based their budgets on this 15% ICR. Any difference between 15% ICR and a project partner's negotiated ICR is being counted as 3rd party in-kind match and is described above as "unrecovered indirect costs."

The cost of this project is based on the number of corals of each size outplanted. Large corals cost more than small ones due to longer maintenance times in the nurseries and greater outplanting effort. The project is fully scalable, so a lesser amount of funding could be accepted and the number of corals outplanted would be scaled back accordingly or a greater amount of funding would lead to more corals outplanted.

9. Technical Feasibility: (Explain how this project is technically feasible; ie, how do you know that this is a feasible project that can be implemented and that will result in success. Describe the technologies involved. Describe relevant past experience or proven success with this type of technology and this type of project. Describe why this project is likely to succeed.)

Maximum 5 pts. Is this approach likely to work?

Acropora Nurseries

The project's primary restoration and recovery approach is to take small fragments of live tissue from healthy coral colonies of known genetic stock, grow them out in undersea nurseries over time to create multiple colonies of each genetic type, and then outplant genetically distinct individuals in proximity to one another so they spawn and help reseed surrounding reefs. Each outplanting site directly enhances live coral cover, three dimensional structure, fisheries habitat and tourism value. For a more detailed discussion of the methods used in this project, see Appendix 1.

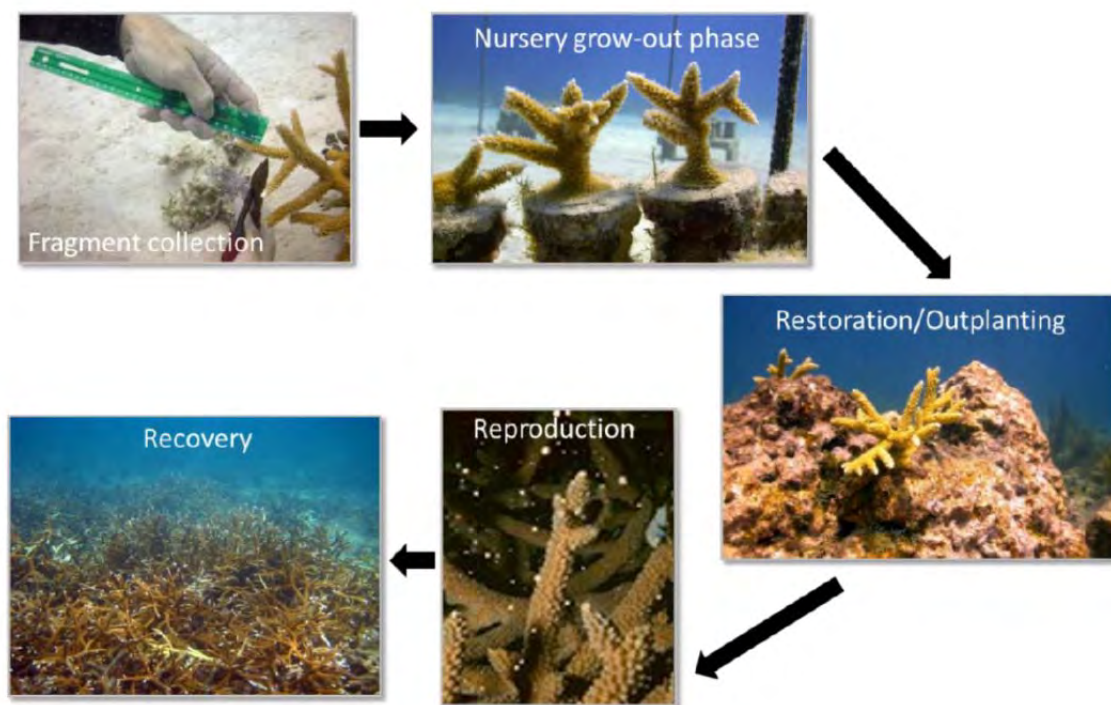


Figure 2. Acropora nursery recovery and restoration approach.

This project has been through an extensive “feasibility study” period beginning in 2004. In addition, the expertise and knowledge gained to date has been formalized into a “Practitioner's Guide to *Acropora* Restoration” (Johnson et al., 2011) that provides science-based guidelines for the activities to be undertaken as part of this expansion.

Over the past 10 years in the Upper Keys, and the past 4 years regionally (Ft. Lauderdale south to the Dry Tortugas in Florida and St. Croix and St. Thomas in the U.S. Virgin Islands), this program has scaled up from one nursery with a few hundred corals to 16 nurseries with over 40,000 corals. A significant investment was made in 2009 by the National Oceanic and Atmospheric Administration (NOAA) through the American Recovery and Reinvestment Act (ARRA) to scale the nurseries to production-level and get them ready for large-scale outplanting efforts. Funding through the RESTORE Act would allow this program to realize its outplanting potential at a scale that is highly significant for the ecosystem and economy of the Florida Keys.

Proven Success. This project was born from a high school 4-H project in Key Largo, Florida. In 2000, twenty staghorn coral (*Acropora cervicornis*) larvae representing 3 genotypes settled and grew on an underwater live rock farm leased and operated by Ken Nedimyer. He and his daughter began to propagate the coral in a prototype coral nursery and later approached The Nature Conservancy (TNC) and Florida Keys National Marine Sanctuary (FKNMS) about using the coral for restoration purposes.

The first nursery was established in 2004 as part of a partnership between Coral Restoration Foundation (CRF) and The Nature Conservancy and funded by the TNC-NOAA Community-

Based Restoration Program using corals that had settled on Ken Nedimyer's live rock farm in the Upper Keys and had been propagated on a small scale. Coral fragments from those original corals and others that were collected from Upper Keys reefs were established in a seafloor nursery, grown out for a year, and fragmented to create material for outplanting. The first outplanting included four sites ranging from inshore to offshore in the Upper Keys and it met with good success.

In August 2006, the same funding source enabled the project to be replicated in the Lower Keys, Biscayne National Park, and off Broward County. Each nursery and outplanting effort was managed by a new partner; Mote Marine Laboratory, University of Miami, and Nova Southeastern University, respectively. The same methods were used to collect material from wild colonies, grow them out in nurseries for a year, and then strategically outplant corals to reefs in each region.

When ARRA was passed in 2009 and money became available for large-scale, shovel-ready restoration projects through NOAA, this project was ready to move from experimental to production level. This funding allowed expansion within the already existing sites, and new partners were added in the Middle Keys (with Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute's Florida Keys Lab), and St. Thomas and St. Croix in the U.S. Virgin Islands (TNC - USVI Program). The nurseries expanded their inventory of genotypes and spent the first two years of the project growing out and propagating the corals to increase stock within the nurseries.

In conjunction with the ARRA funding, The Nature Conservancy entered into a cooperative agreement and received funding from the National Park Service to start a nursery in Dry Tortugas National Park. The nursery was installed and stocked in 2010 and the first outplanting event occurred in April 2012 and the outplants have shown close to 95% survivorship. Work in the Dry Tortugas, although logistically challenging, is very important to the rest of the Keys because of its downstream location; it is likely that coral spawn and larvae from this location will settle onto Keys reefs.

In 2012, just under 6,000 colonies were outplanted to 46 individual restoration sites. Immediately following outplanting, the nurseries housed over 30,000 corals, many of which are large enough to be split into multiple outplant-sized colonies.

Monitoring at the outplant sites at one and three months following outplanting showed high success rates. The outplanted corals began to grow over the nails and/or epoxy that initially secured them to the seafloor and attached themselves to the reef within a few months. Today they are growing and branching quickly. Over 70% survivorship has been achieved at all sites, with many sites showing much higher survival rates. This success is despite the fact that two storm systems - Tropical Storm Isaac and Hurricane Sandy - caused damage at specific sites, and short-lived coral disease outbreaks followed both systems. Table 2 shows average survival rates for each region based on monitoring of ARRA and Dry Tortugas outplants.

Table 2. Outplant survivorship rates in each region.

Broward	88%
Biscayne	88%
Upper Keys	98%
Middle Keys	95%
Lower Keys	90%
Dry Tortugas National Park	93%

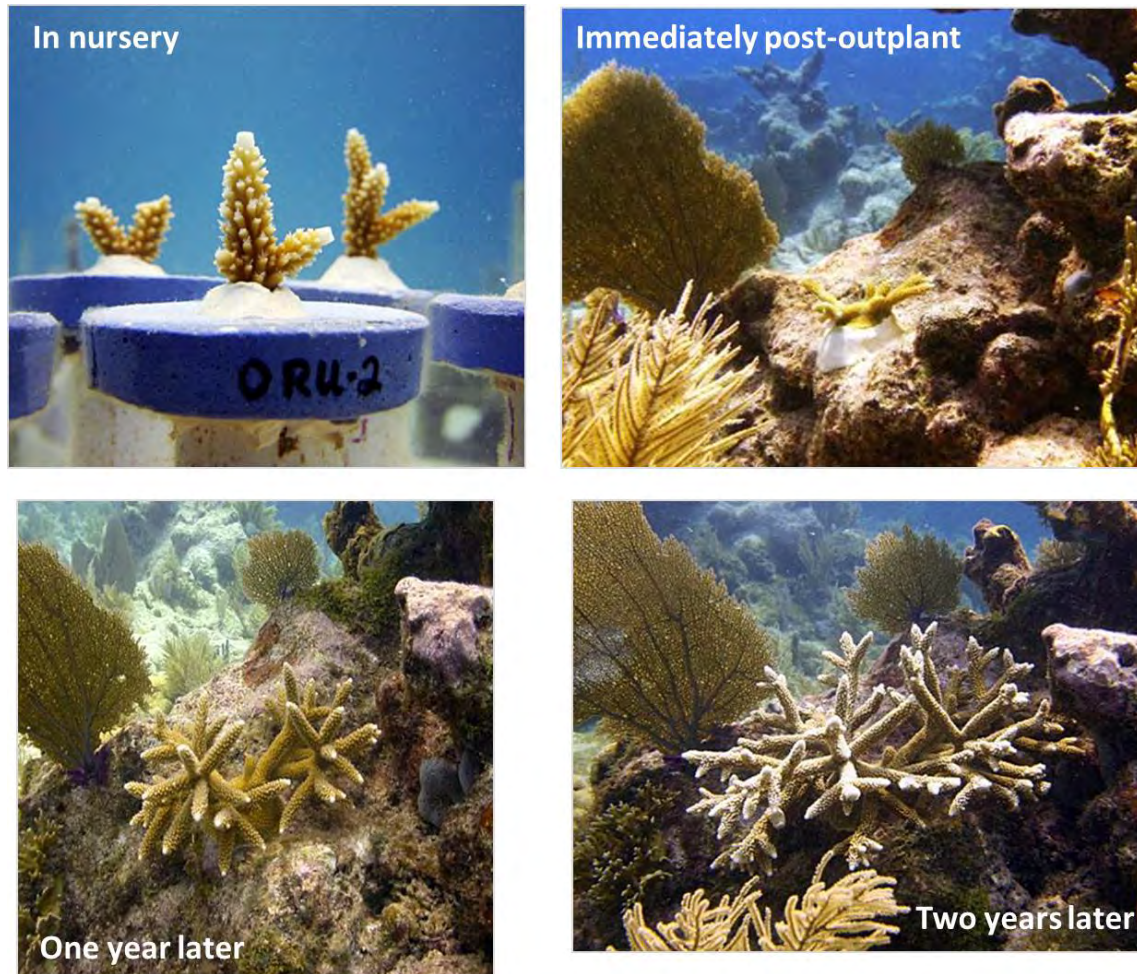


Figure 3. Outplant growth over a three-year period.

Land-Based Microfragmentation

The project's other restoration and recovery approach is to create boulder coral microfragments from existing material in Mote's land-based nurseries and use them to perform coral "reskinning". These corals are 1cm by 1cm fragments with the bases cut so that the coral tissue lies flush against a 2.5 cm² ceramic tile in order to maximize growth efficiency. Corals are

maintained in a land-based facility for 6-8 months until they are ready for outplanting, which occurs when corals have completely grown over their ceramic mounts. Outplanting involves placing multiple microfragments onto a large dead coral head and allowing each fragment to grow independently. Within a relatively short period of time the fragments grow together and fuse over the entire coral head. This process occurs much faster than the traditional approach of planting fewer large boulder coral fragments onto the reef. Given growth rates exhibited by fragments in culture, each group of 10 outplanted fragments should completely merge in as little as 2-3 years. When this occurs each group of fragments will cover roughly 650 cm², whereas a wild colony originating from a coral larvae would take decades to achieve that size.

In addition to the facilities already installed at Mote Marine Laboratory's Summerland Lab, two raceways will be installed at Pigeon Key. The raceways will be used to propagate corals in a public setting where students, summer campers and the general public can learn and see first-hand the coral restoration process. The raceways at Pigeon Key will be installed during the first half of year 1 and are not calculated into the full production and outplanting numbers for year 1 but will contribute to outplantings in years 2 and 3.

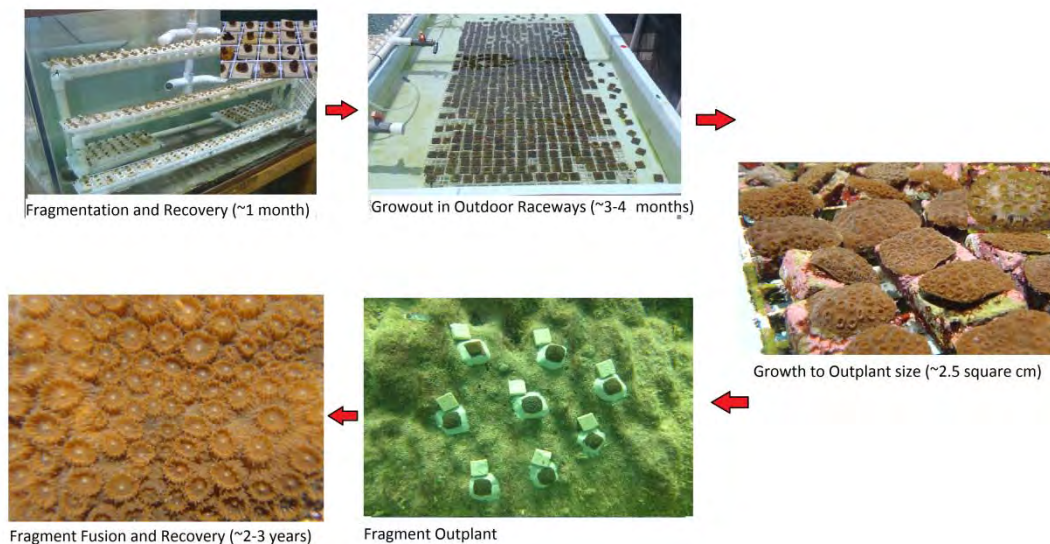


Figure 4. Boulder coral recovery and restoration approach.

Proven success. Mote Marine Laboratory has worked with the species in question producing large fragments for close to 5 years prior to the development of the microfragmenting technique. Fragment production has increased exponentially through the production of microfragments. In 2011, the number of large fragments present at the facility was matched by the number of microfragments in less than 6 months. In 2012, an additional 1,000 microfragments were created during 1 month, and the lab is on track to produce upwards of 10,000 fragments in 2013. Mote is now able to provide renewable source material for large-scale restoration projects incorporating

these increasingly rare stony coral species, something which has not been achieved prior to these efforts.

In 2010 and 2011, Mote scientists performed outplanting using large land-cultured coral fragments to assess the feasibility of using these corals for restoration purposes. Four boulder coral species were planted including *Montastrea faveolata*, *Montastrea cavernosa*, *Stephanocoenia intersepta*, and *Siderastrea siderea*. In total, 312 fragments were mounted on cinder blocks directly adjacent to inshore and offshore reef environments near Big Pine Key. Three years after outplanting, nearly 90% of colonies are healthy and growing with survivorship highest in the *M. faveolata*, *M. cavernosa*, and *S. siderea*. Colonies have displayed substantial growth and resilience to changing conditions during this time, which suggests that land-cultured corals can be used effectively for restoration.

In a proof of concept outplant performed in May 2013, a total of 192 fragments were outplanted at an inshore and an offshore reef near Big Pine Key. At each site 48 *Montastrea cavernosa* and 48 *Montastrea faveolata* were divided into 12 small arrays of 8 fragments each. Arrays were planted haphazardly along the surface of a dead coral skeleton and spaced evenly over an area 30cm in diameter. This initial area was selected to be well above reproductive size, which occurs in colonies greater than 100cm² (Szmant, 1991). Fragments were secured to dead skeletons of the same species using underwater epoxy (all fix, Cir Cut Corporation). The sides of each tile were shored up with epoxy so that a gentle gradient was present between the fragment and the substrate (Figure 11), to allow ease of initial growth onto surrogate skeletons. Acclimation to each site was a success, with all fragments displaying vibrant colors and healthy polyp extension shortly after being planted. One month later, many corals had already begun sheeting out over available substrate adjacent to each fragment. Fragments were also shifting their pigmentation to resemble the variation associated with naturally occurring colonies at each site. These preliminary results suggest that planted fragments are adapting well to their new environment and are well on their way to restoring the heads they were planted on.

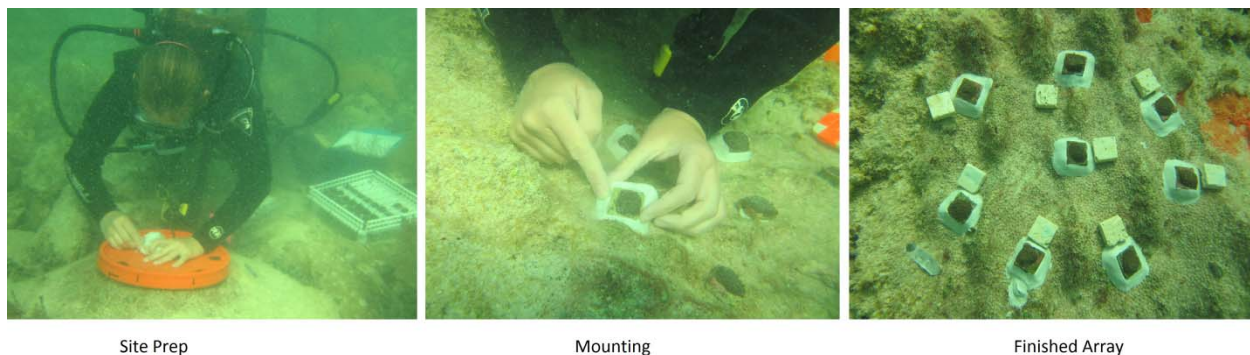


Figure 5. Depicted is the process of securing a coral array to a dead skeleton. Each site was cleaned and marked according to a 30cm template; fragments were then secured using epoxy and photographed to track growth and survival.

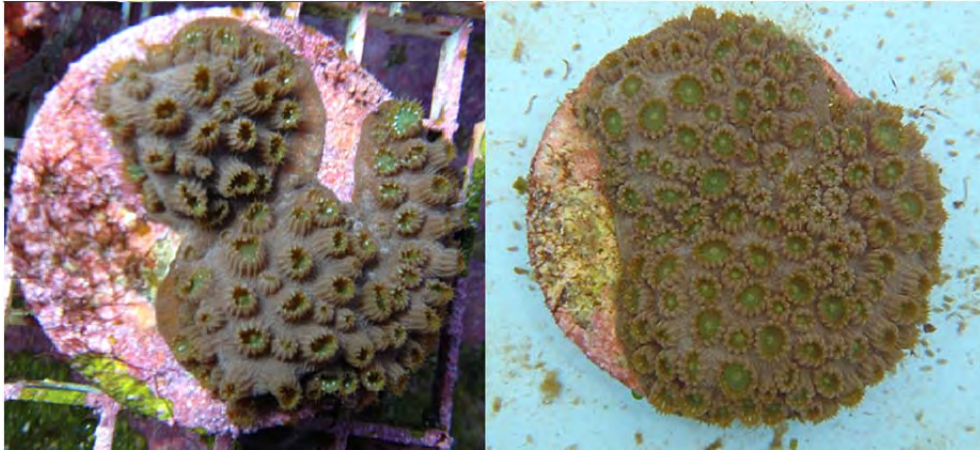


Figure 3. When two microfragments from the same broodstock colony come into contact, they merge together to more quickly resheet the colony.

10. Readiness for Implementation/Permitting Considerations: (What steps are necessary and how long will it take to implement this project? Describe the required design and permitting work required for implementation. How far along is the design and permitting? Has it started? Is it complete? If required permits have already been obtained, please attach copies. If the design has been completed, please attach copy of the design work. If the design work has not yet begun, please tell us how long this will take. If permits are required, but not yet obtained, please discuss how you know your project will qualify for the required permits and how long will this permit process take. In other words, if your project is not shovel-ready, what is entailed and how long will it take before it becomes shovel-ready? Identify the specific milestones and timeframe for each.)

Maximum 10 pts. Is the timeframe realistic? Is the permitting achievable? Is the timeframe acceptable?

Acropora nurseries

This project builds on extensive preexisting work, thus leveraging a significant amount of expert knowledge and resources. No start-up phase will be needed prior to actual on-the-ground restoration being conducted using this funding. The nurseries are stocked and ready for significant outplanting.

A list of permits is included in Tables 2 and 3 below and copies of the permits are included in Appendix 2. A minimum of 120 potential outplant sites have already been approved by the Florida Keys National Marine Sanctuary and Florida Fish and Wildlife Conservation Commission (FWC), and our permits are written such that adding new sites requires only a modification.

The FWC and National Park Service permits are only good for one year so they will need to be renewed on an annual basis. However, since two permits for this project have already been issued and the permit issuers are active project partners, getting permits for additional years should not be a problem. The Nature Conservancy is aware of the timeframes necessary to obtain permits so as not to impede work.

Table 2. Current permits for Acropora restoration work.

Permitting Entity	Type of permit or approval	Applicant	Permit/ Tracking #	Issuance date	Expiration date
National Marine Fisheries Service	Biological Opinion	Caitlin Lustic, TNC/Tom Moore, NOAA Habitat Restoration Center	F/SER/2011/05414	9/14/2011	N/A
FL Fish and Wildlife Conservation Commission	Special Activity License	Caitlin Lustic, TNC	SAL-13-1086A-SCRIP	4/09/2013	4/08/2014
Florida Keys National Marine Sanctuary	Permit to Further Natural Resource Value of the Sanctuary	Caitlin Lustic, TNC	FKNMS-2011-150-A1	6/28/2013	6/27/2018
Dry Tortugas National Park	Scientific Research and Collecting Permit	Meaghan Johnson, TNC	DRTO-2013-SCI-0002	3/1/2013	3/1/2014

Land-based microfragmentation

Microfragment production numbers at Mote Marine Laboratory in Summerland Key are already in place and with the capacity to reach or exceed the production numbers proposed. Field nursery and field outplanting productions will be ramped up during the first few months of the project. Permits for the land and field based process have been in place since 2010 and will be updated and modified for this project, to include permits for the Pigeon Key working demonstration raceway nursery.

Table 3. Current permits for boulder coral restoration work.

Permitting Entity	Type of permit or approval	Applicant	Permit/ Tracking #	Issuance date	Expiration date
FL Fish and Wildlife Conservation Commission	Special Activity License	Christopher Page, Mote Marine Lab	SAL-13-1445-SCRIP	4/01/2013	3/31/2014
Florida Keys National Marine Sanctuary	Permit to Further Natural Resource Value of the Sanctuary	David Vaughan, Mote Marine Lab	FKNMS-2012-151	12/4/2012	6/30/2014
Florida Keys National Marine Sanctuary	Scientific Research and Collecting Permit	David Vaughan, Mote Marine Lab	FKNMS-2012-050	4/17/2012	4/16/2015

11. Project Completion Timetable: (Once the project can be implemented, what are the steps and how long will it take to complete the project? Identify milestones and timeframe for each.)

Maximum 10 pts. Timeframe realistic? Is the timeframe acceptable?

Work on this project can begin as soon as the project is awarded funding. The Acropora nurseries are stocked and all necessary permits have been obtained. As described earlier, Mote's facility on Summerland Key is prepared for large-scale production of boulder coral fragments. The Pigeon Key facility will be set up within the first few months of the project and will be ready within a year to be included in production for outplanting. Rather than dictate a certain number of corals to be outplanted each year, the partners will have flexibility as to when they outplant, which allows them to create a schedule based on their individual nursery stocks and complete the work in the most cost-effective manner.

Acropora Outplanting												
	Jan-Mar	Apr-June	Jul-Sep	Oct-Dec	Jan-Mar	Apr-June	Jul-Sep	Oct-Dec	Jan-Mar	Apr-June	Jul-Sep	Oct-Dec
Permitting												
Nursery Maintenance												
Site Selection												
Outplanting												
Monitoring												
Grant Reporting												
Permit Reporting												
Land-based Outplanting												
Permitting												
Pigeon Key Raceways Installed												
Pigeon Key Raceways Stocked												
Raceway and Nursery Maintenance												
Site Selection												
Outplanting												
Monitoring												
Grant Reporting												
Permit Reporting												

12. Environmental Benefits: (Describe the nature, magnitude, and timing of any environmental benefits attributable to the project. Identify and quantify all environmental benefits expected. How will these benefits be measured and evaluated? How long before benefits are realized? Are these benefits short-term? Long-term? Identify the party responsible for the achievement of these benefits. Describe how your project is sustainable. (In other words, how much or what percentage of the project's services and/or benefits will still be delivered and maintained after the project is complete and/or funding has ended.) How will you monitor and ensure sustainability after the funding has ended. Please address any potential environmental impacts (ie, loss of habitat) associated with implementing or maintaining the project.)

Maximum 10 pts. Are the benefits impactful? Do the benefits address/correct/mitigate/advance a critical need/issue? Likelihood of achieving these benefits? Acceptable timeframe for achieving the benefits? Does the project have long-term sustainability?

Live coral provides the three dimensional structure associated with reefs; without live tissue producing new limestone, the reef framework erodes away over time. The diversity and structural complexity of shallow water reefs have been greatly reduced and fleshy macroalgae now occupies much of the space formerly occupied by live coral. Increased cover of algae and sediment inhibits successful coral larvae settlement. Combined, the ability of Florida's reefs to cope with and recover from ongoing disturbances (e.g. diseases, bleaching events, ship groundings, hurricanes, water pollution events) is significantly reduced. By outplanting live corals to the reefs, we can increase coral cover and diversity, and restore structure that is important for other species that make their home on the reef.

Living reefs provide essential habitat for fishes including many commercially and recreationally important species (Bruckner, 2002; Shinn, 1966). Juvenile reef fish, schooling bait fish, large herbivores and predatory reef fish, and invertebrates are associated with staghorn and elkhorn thickets on reefs (Lirman, 1999). Based on a review by Bruckner (2002) in the Proceedings of the Caribbean *Acropora* Workshop: Potential Application of the U.S. Endangered Species Act as a Conservation Strategy (Proceedings): "The structural and ecological roles of Acroporid corals in the Caribbean are unique and cannot be filled by other coral species. Their rapid accretion rates and structural complexity are unmatched. The loss of these characteristics will likely result in a significant loss of reef function and structure. At present, there is no indication that any other Caribbean coral species can replace the important role that Acroporid corals play within reef communities of the region."

The benefits of increased coral cover and diversity, and structural complexity will be realized as soon as corals are restored to the reef. Past outplanting of both Acroporid corals and boulder coral species have had high success rates (>75%). The outplant sites will be monitored at least twice after outplanting to determine coral survivorship and condition. Some outplants will be monitored more frequently or for a longer period of time to answer specific research questions that may help increase success at future outplant sites.

Over time, the corals will continue to grow and contribute to the spawning population which should help reseed reefs throughout the Florida Keys. Each outplant site has a direct restoration

area of at least 100 square meters. The dispersal range of coral larvae resulting from sexual reproduction of the restored corals is conservatively 1 kilometer, creating a potential long-term restoration area of 74 hectares per site. The benefits of increased coral cover and habitat structure will continue well past the life of this project funding, both at the direct outplant sites and regionally.

13. Economic Benefits: (Describe the economic benefits that will be achieved. Identify and quantify all economic benefits expected. How will these benefits be measured and evaluated? When do you expect to see the results? Are these benefits short-term? Long-term? How will you ensure the achievement of long-term benefits? Identify the party responsible for the achievement of these benefits. Describe how your project is sustainable. (In other words, how much or what percentage of the project's services and/or benefits will still be delivered and maintained after the project is complete and/or funding has ended.) How will you monitor and ensure sustainability after the funding has ended. Is this a workforce development project please describe how the project will result in new, expanded or retained business development opportunities and job creation. Please include detail about what types of jobs will be created. How many and when? What is the anticipated annual salary or hourly rate, are the jobs full time or part time, are benefits included, etc.?)

Maximum 10 pts. Level of benefits? Do they address/correct/mitigate/advance a critical need/issue? Likelihood of achieving these benefits? Acceptable timeframe for achieving the benefits? Does the project have long-term sustainability?

Coral reefs and associated habitats provide fishery and nature tourism resources that represent a critical source of food and livelihoods for people. Monroe County residents and businesses received just under \$200 million from the Gulf Coast Claims Facility on more than 11,000 claims following the DeepWater Horizon disaster. The Florida Keys National Marine Sanctuaries Socioeconomics Fact Sheet reports that:

- 1) More than 33,000 jobs in the Florida Keys are supported by ocean recreation and tourism, accounting for 58 percent of the local economy and \$2.3 billion in annual sales.
- 2) From 2007 to 2008, more than 400,000 visitors and residents of the Florida Keys engaged in over 2 million person-days of recreational sports fishing. These recreational fishers spent \$262 million in Monroe County/Florida Keys, approximately \$103 million of which was directly spent on fishing items.
- 3) Approximately 739,000 visitors and residents participated in 2.8 million days of diving in the Florida Keys between 2007 and 2008; \$51.7 million was spent at diving/snorkeling operations. Moreover, divers spent a total of \$450 million in Monroe County, Florida Keys, supporting more than 7,500 jobs.
- 4) In 1995, it was estimated that fishermen received \$56.5 million in harvest revenue which generated \$92.2 million in sales/output in Monroe County, or about 4.5% of the total economy in 1995. This sales/output generated over \$58 million in income and 4,130 jobs, 8.8% of all Monroe County employment.

In Monroe County, the commercial fleet supports approximately 1200 families, which is close to 5% of the county's population. In 2006, Monroe County was ranked the 5th most valuable port in the nation with a dockside of approximately \$54.4 million, excluding retail sales of profits made by wholesalers who marketed seafood products worldwide. Therefore, it is reasonable to predict that seafood and related industries earned upwards of \$70 million (Florida Keys Commercial Fishermen's Association).

Along with these tangible commodities provided by coral reefs, the intrinsic beauty of healthy reef communities is an important factor in the quality of life and recreational satisfaction of Keys residents and visitors. Restoration of these critical reef-building corals will provide added recreational and commercial benefits to Monroe County and the State of Florida through enhanced fishing, diving and snorkeling opportunities.

The aesthetic changes on the reef will be realized immediately. Divers and snorkelers love to visit reefs that have been restored, both because they have more live coral and because they are an example of how people can make a positive difference in the future of reefs. Even small corals can look impressive if they are outplanted densely.

Over time, these corals will continue to grow on the reef – within 3-5 years even the smallest *Acropora* outplants will be basketball-sized and *Montastrea* outplants will be well on their way to reskinning dead coral heads. These corals are even more impressive to divers and are almost indistinguishable from natural colonies. They also will be providing important nursery habitat for small fish and helping to contribute to a healthy reef fish population.

The Socioeconomic Research and Monitoring Program for FKNMS tracks natural resource user satisfaction over time based on natural resource attributes, facilities, and services. The primary goal of the socioeconomic research and monitoring is to detect and document resultant changes in Sanctuary resource utilization patterns and their impact on market and nonmarket economic values of Sanctuary resources. Baseline measurements for the Recreation and Tourism portion of this monitoring effort were obtained in a 1995-1996 study entitled “Linking the Economy and Environment of the Florida Keys/Florida Bay” (Leeworthy et al.). Follow-up surveys were completed in 2000-2001 and 2007-2008. Continued follow-up monitoring should identify changes in resident and visitor satisfaction over time.

14. Community Economic and/or Environmental Resilience Benefits: (Describe if the project assists with our community’s ability to anticipate, withstand, or recover (environmentally and/or economically) from hazards or threats, eg. Hurricane evacuation, flood mitigation and prevention, future oil spills, shoreline protection, etc.)

Maximum 5 pts. Level of benefits? Do they address/correct/mitigate/advance a critical need/issue? Likelihood of achieving these benefits? Acceptable timeframe for achieving the benefits?

Healthy coral reefs have rough surfaces and structures that help dissipate the force of waves that would otherwise break on the shoreline

(http://www.noaa.gov/features/protecting_1208/coastlines.html). Up to 90% of the energy from wind-generated waves is absorbed by reefs. Every meter of reef protects an estimated \$47,000 of property value in the US (The H. John Heinz III Center for Science Economics and the Environment, 2000). In Florida, the absence of reefs would cause parts of the shoreline to be eroded. Therefore, the health of Florida's reefs is directly related to the shoreline's ability to withstand the wave energy of hurricanes and other wave-generating events.

A recent study entitled "Coastal habitats shield people and property from sea-level rise and storms" assesses and ranks coastal habitat types for their ability to reduce the relative vulnerability of people and property to erosion and flooding from storms, and ranks reefs at the highest level of protection with a protective distance of 2,000m. Florida also ranks highest in the number of protected people and protected property value. Figure 10 below shows the total property value for which habitats (mainly coral reefs in Monroe County) reduce exposure to storms and sea-level rise in each coastal county for the a) current and b) one potential sea-level rise scenario as defined by the IPCC (A2).

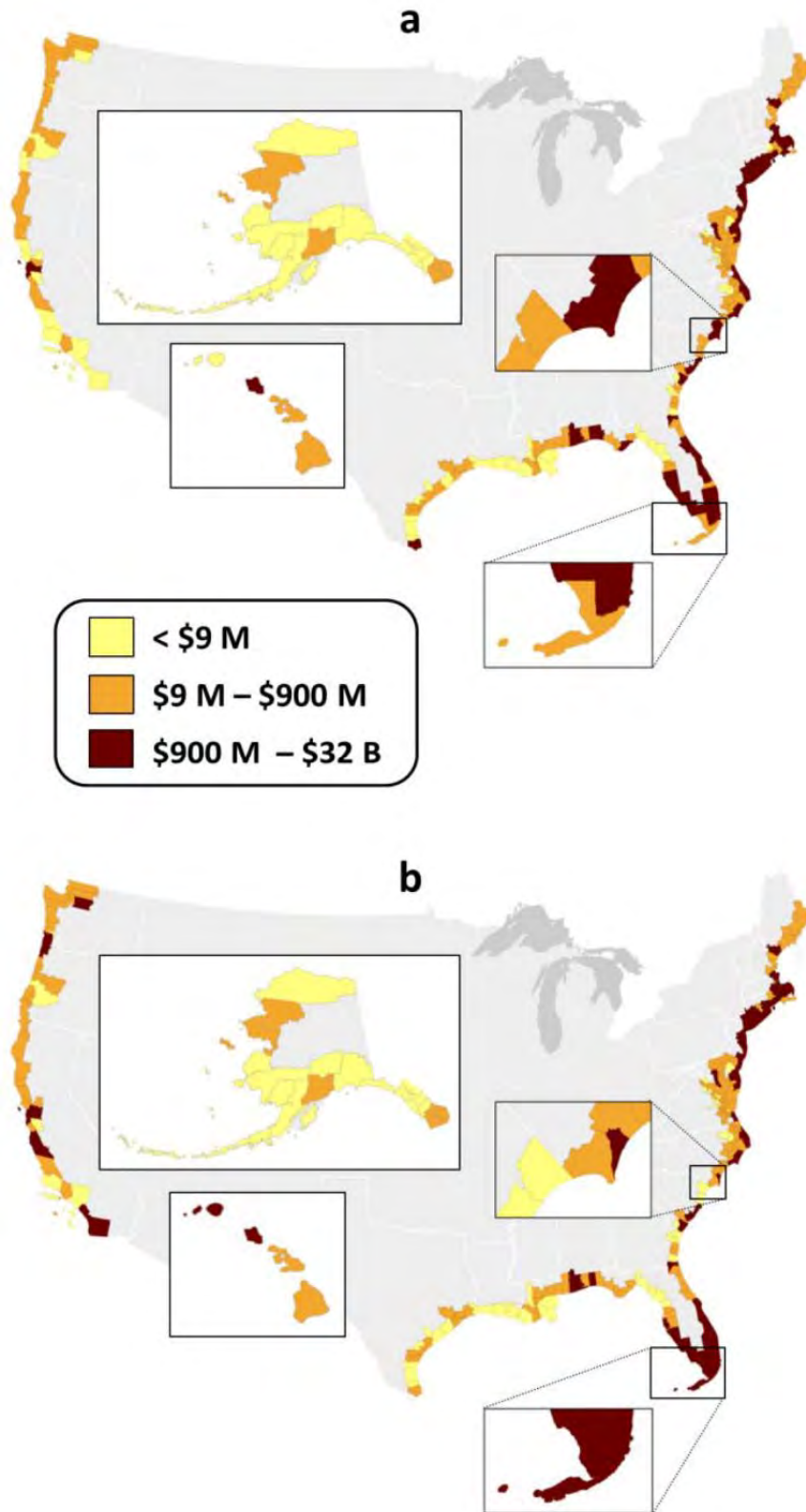


Figure 74. Total property value for which habitats (mainly coral reefs in Monroe County) reduce exposure to storms and sea-level rise in coastal counties.

15. Complements to Existing Efforts/Public Acceptance: (How does the project complement existing local, regional or state efforts/plans/objectives or on-going efforts/activities. Explain why your project does not interfere or conflict with any existing efforts, and why your project is not duplicative of any existing efforts. Also, please explain whether your project is consistent with/included in a local government Comprehensive plan, Capital plan, Mitigation Plan, Wastewater or Storm Water Master Plan, etc. If not part of an already approved plan, please describe any known or potential public approval or opposition to the project. Explain any efforts to determine public acceptance.

Maximum 5 pts. Does the project align with county and/or municipal priorities? Is there clear public support?

It is widely recognized that active restoration must be paired with large-scale management efforts aimed at protecting coral reefs region-wide. The need to link active restoration with other available management tools such as Marine Protected Areas has been recently highlighted in the review conducted by Young et al. (2012) where restoration practitioners gave the highest likelihood of success to reef restoration efforts conducted in areas that were under concurrent protection from human activities. Consequently, the efforts outlined here are nested within a larger coastal threat-abatement framework in Florida. Ongoing threat abatement strategies are implemented under the FKNMS and DTNP management plans. The FKNMS is currently undergoing a regulatory review process, during which the Sanctuary will review existing regulations to determine whether they have provided the necessary protections, and propose new regulations where existing ones have been inadequate. The State of Florida recently committed \$50 million towards wastewater treatment infrastructure in the Keys. This funding catalyzes Monroe County's commitment of local sales tax funds and assessments of individual property owners that will result in removal of inadequate septic tanks and cesspits that leak pollution into the Keys' nearshore waters. These updated wastewater systems should be complete by the end of 2015.

This coral restoration project has the approval of local, state, and Federal reef management agencies, including the Florida Department of Environmental Protection's Coral Reef Conservation Program, Florida Fish and Wildlife Conservation Commission, NOAA, the National Marine Fisheries Service, the National Park Service, and FKNMS. We have also received support letters from the Florida Keys Commercial Fisherman's Association for this project under other recent funding proposals.

Fury Watersports in Key West has recently recognized the importance of our work for the enjoyment of locals and tourists alike and has voluntarily implemented a program through which \$.50 per snorkeling customer is donated to Mote Marine Lab's coral restoration program.

16. Compliance with Federal, State, Local Regulations: (Describe how the project complies with all regulations. Note: Additional restrictions and requirements may be applicable based on US Treasury guidance to be established pursuant to the RESTORE Act.) **No points awarded, since compliance with regulations is required.**

All necessary permits have been obtained or will be obtained prior to any work being completed. We are aware that other restrictions and requirements may apply for this funding and are prepared to work through those if funding is awarded to this project. The Nature Conservancy and the other project partners successfully complied with all regulations associated with a American Recovery and Reinvestment Act-funded project of similar size and scope between 2009 and 2012.

17. Project Management Capacity: (We expect that all funded project will receive a high degree of scrutiny from both state and federal agencies throughout the duration both programmatically and financially, and will be required to comply with a rigorous standard for monitoring, reporting and auditing of both results and expenditures.

Please also note that the framework for RESTORE Act project funding has not yet been defined but will likely draw significantly from federal grant guidelines, rules, regulations and requirements. Therefore, assuming the applicant entity will be responsible for implementing and administering its projects according to federal grant guidelines, concisely:

1. Describe the expertise, experience and prior success of the organization and persons to implement the type and size of project proposed here.
2. Describe the organization's experience with federal grant requirements, and with management of government grant-funded projects of this type and size, including financial and outcomes, monitoring, reporting and auditing.
3. Describe your plan for programmatic and financial management, oversight and monitoring.
4. Describe the project management team, including the names, qualifications, experience and prior success of those responsible for design, implementation, outcomes achievement, and financial management.)

Maximum 10 pts. Does the organization or sponsor have the demonstrated ability and experience to implement/administer this project, and deliver on the outcomes?

As an organization, TNC receives public funding from local, state and federal programs, as well as a variety of private funders. Each of these funding sources comes with its own rules, regulations and guidelines that TNC is expected to comply with when administering the award. Each award has a dedicated project manager, attorney and grants specialist who work as a team under the project, from cradle to grave, to ensure that not only the overall rules and regulations/guidelines are followed for each award (i.e. – for federal awards the relevant Office of Management and Budget (OMB) Circulars, Federal Acquisition Regulations (FARs), Agency Handbook, etc.) but, rules and guidelines that may be specific to an individual award. The team is also there to ensure that specific state laws are not compromised in carrying out award programs. All individuals on the project team receive on-going training and education in the area of government grant awards as long as they are employed with TNC. TNC has successfully implemented complex NOAA awards, Department of Defense (DoD) Army Compatible Use Buffer awards, US Agency for International Development (USAID) awards (TNC's international

programs), American Recovery and Reinvestment Act awards, and Environmental Protection Agency (EPA) Great Lakes Restoration Initiative, to name a few.

TNC receives an annual external audit per OMB Circular A-133 on federal funds expended each fiscal year. In addition, numerous states we work in have state single audits requirements that we must adhere to. TNC also has a centralized Internal Audit department that randomly conducts both desk and full state audits on an annual basis to ensure the organization is in compliance with not only external funder programs, but our own internal standard operating procedures and policies. Because TNC receives so much federal funding to carry out its conservation mission, most of our standard operating procedures and policies were written with the Circulars and other Federal Rules and Regulations in mind.

The project manager provides the technical/scientific expertise to carry out the awarded project. They are also responsible for all programmatic deliverables. The grants specialist provides financial oversight and monitoring, prepares financial reports and works with the project manager in reviewing same for accuracy before submitting. The grants specialist, in coordination with the attorney and project manager, ensure that the project is carried out according the terms and conditions of the award documents, and any relevant rules and regulations/guidelines. The attorney ensures that the award document does not compromise any state laws or internal TNC policies and procedures. The attorney is assigned to the award for life of project, and continues to be a resource for the project manager and grants specialist as appropriate.

The Florida Keys program has been working on the Acropora restoration project under Federal grants passed down through the National Oceanic and Atmospheric Administration since 2004. The first grant through the TNC-NOAA Community-Based Restoration Program (CRP) was obtained in 2004 and funds were passed through to Coral Restoration Foundation. In 2006, a second CRP grant was obtained for project expansion and included work with Mote Marine Lab and two university partners in South Florida.

TNC and the project partners were most recently funded through NOAA under the American Recovery and Reinvestment Act (“Stimulus” Act). The project managers and coordinators at TNC and each of the partner organizations have remained the same, and they are all now familiar with federal grant requirements and high levels of accountability. Under ARRA funding TNC administered subawards for the three partners proposed here, plus two universities in South Florida and also managed the U.S. Virgin Islands restoration activities, with a total budget of \$3.3 million over three years.

At the start of funding, a monitoring plan and tracking spreadsheet will be developed with the partners. This spreadsheet will be due in conjunction with quarterly or biannual financial and programmatic reporting. Each partner will submit quarterly financial reports and will not be paid until TNC has received the deliverables associated with payment and is assured that all work has been completed. Based on the reporting requirements of the Restore Act, a quarterly or biannual report template will be developed for the partners. This will help TNC monitor that the partner’s work is being completed on time and to specification, and will ensure that reports submitted to

the County are complete. A quarterly phone call will be held to encourage knowledge-sharing among partners.

Caitlin Lustic, The Nature Conservancy

Caitlin Lustic is the Coral Recovery Coordinator for the Florida Keys Program based in Big Pine Key. Caitlin served as the coordinator for the American Recovery and Reinvestment Act project; in this role, she worked directly with partners to ensure the work was completed on time and that project goals and timelines were met and reviewed quarterly partner reports and completed NOAA reporting. She now serves as the project manager under TNC-NOAA Community-Based Restoration Grant funding with the same partners. Caitlin serves as a member of the Florida Keys National Marine Sanctuary's Coral Reef Ecosystem Restoration working group. Caitlin holds a Bachelor's degree in biology from The College of Wooster and a Master's of Environmental Management from Duke University.

Meaghan Johnson, The Nature Conservancy

Meaghan Johnson is the Marine Science Coordinator for the Florida Keys Program based in Big Pine Key. She has been managing the Dry Tortugas National Park coral nursery since 2009, including leading all trips for coral collections, nursery maintenance, and outplanting. She is a member of the National *Acropora* Recovery Team. Her background also includes benthic habitat and coral bleaching monitoring, *Diadema* restoration and water quality monitoring. Meaghan holds a Bachelor's degree in marine biology from Bowling Green State University and is currently working towards a Master's degree in Coastal Zone Management from Nova Southeastern University.

James Byrne, The Nature Conservancy

James Byrne, the Marine Science Program Manager, provides managerial, technical and scientific leadership for The Nature Conservancy's marine conservation initiatives in South Florida, the Florida Keys and the Caribbean and plays an integral role in the Florida Chapter's statewide marine conservation program. Before moving to South Florida, he was the Southeast Caribbean Science Director, based in the US Virgin Island's office on St. Croix, where he led the operating unit's multidisciplinary science team in applying science and technology to coastal and marine conservation issues. James served as the project manager under the ARRA grant. He holds a Bachelor's and Master's degree in Marine Affairs and Policy from the University of Miami.

Kathy Doy, The Nature Conservancy

Kathy Doy is a Sr. Grants Specialist at The Nature Conservancy, and has worked in the field of grants administration for over 13 years, eight of those years with TNC. Kathy has experience administering awards in both our domestic and international programs. The Grants Specialists at TNC are part of the Grants Services Network, a centralized body of specialist who report up as a whole to the Director of the Grants Network within TNC's Worldwide Office. The Grants Service Network receives on-going trainings and professional development via the Worldwide Office.

Laura Robinson, The Nature Conservancy

Laura Robinson is a Senior Attorney at The Nature Conservancy and has provided legal grants review and support for the Conservancy's Florida Chapter for over 19 years. Laura has provided legal support for the American Recovery and Reinvestment Act project as well as the TNC-NOAA Community-Based Restoration Grant funding with the same partners. Laura is a member of TNC's Grants Service Network. Laura holds a Bachelor's degree in Zoology from the University of Florida and a Juris Doctor from the Levin College of Law, University of Florida.

Ken Nedimyer, Coral Restoration Foundation

Ken Nedimyer is president of the Coral Restoration Foundation, Inc., a 501 c (3) nonprofit based in Tavernier, Florida. Since 1985, Ken has owned and operated Sea Life Inc, which supplies marine specimens to aquarists and pet stores throughout the United States. Ken has worked with a variety of different coral reef scientists and aquaculturists on projects ranging from culturing marine tropical to transplanting sea urchins and corals on the reef. Ken owns and operates the first offshore live rock aquaculture farm in the Florida Keys and has developed a highly successful coral nursery program adjacent to the live rock farm. Ken's work focuses on maintaining and expanding the offshore coral nursery, developing coral restoration projects, and teaching others how to do the same. His nursery grew over the course of the ARRA project from 3,500 to 35,000. He is president of the Florida Marine Life Association, spokesman for the Florida Fish and Wildlife Conservation Commission's Marine Life Work Group, Chair of the Florida Keys National Marine Sanctuary's Advisory Council, and a member of the Coral Advisory Panel for the South Atlantic Council. Ken holds a Bachelor's degree from Florida Atlantic University.

Kerry Maxwell, Florida Fish and Wildlife Conservation Commission

Kerry Maxwell is a Research Associate for the Florida Fish and Wildlife Research Institute, South Florida Regional Lab in Marathon FL. She has been working in south Florida ecosystems since 1999, first focusing on lobster biology, then on coral restoration ecology. Kerry has been the project manager for FWC's middle Keys nursery since 2009, has managed coral restoration grant funding, and has overseen nursery development and growth and coral outplanting research. Kerry holds a Bachelor's degree from Hamilton College and a Master's degree from Georgia State University.

John Hunt, Florida Fish and Wildlife Conservation Commission

John Hunt is a Program Administrator for the Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute and serves as the manager of the Commission's South Florida Regional Laboratory. He has been conducting and managing research on fishery and ecosystem resource issues in the Florida Keys for 32 years. The results of his research have been used to establish the current management system for Florida's spiny lobster fishery and in the establishment of the marine reserves of the Florida Keys National Marine Sanctuary and the Research Natural Area of Dry Tortugas National Park. He is the PI of a grant whose mission is to develop a suite of research strategies related to coral reef restoration whose output will be to inform the FWC Florida Wildlife Legacy Initiative. He received a M.S. degree in Marine Science from The University of North Carolina at Chapel Hill in 1981.

Erich Bartels, Mote Marine Lab

Erich Bartels is the Staff Scientist at Mote Marine Lab on Summerland Key. He is responsible for managing and coordinating multiple coral reef research projects, coordinating use of wet and dry lab space, and providing boat operations and diving/field support for visiting scientists. He is also the Dive Safety Officer for Mote's dive program. Erich has been leading the Lower Keys staghorn restoration project since 2006, including the large-scale expansion of the nursery under ARRA funds. He holds a Bachelor's degree from Florida Institute of Technology.

Dave Vaughan, Mote Marine Lab

Dr. Dave Vaughan is Executive Director of the Mote Tropical Research Lab in the Florida Keys and manages the Coral Restoration Program. He has operated marine research and culture facilities for over 35 years. He has operated production-sized hatcheries, including the nation's largest clam hatchery in Florida and Oceans, Reefs and Aquariums (ORA), the world's largest marine ornamental culture facilities. He specializes in developing and operating environmentally friendly research and production culture systems, operated within non-profit organizations. He has a PhD from Rutgers University.

18. Additional Information: (Please include any maps, designs, drawings, photos, or background resources that may assist in understanding the project. Please be mindful of the electronic file size of your application. We will be forwarding this application to various reviewers/recipients electronically. Many servers do not accept large file sizes. Also limit attachments to those measuring 8x11 that can be reproduced with little or no expense (limit color photos, blueprint type documents, etc.)

List of Appendices:

Appendix 1: Detailed project plans for both underwater nurseries and land-based nursery facilities.

Appendix 2: Partner Budgets

Appendix 3: Letters of commitment from: TNC for cash match in the amount of \$100,000; Coral Restoration Foundation for in-kind match in the amount of \$275,000; Florida Fish and Wildlife Conservation Commission for in-kind match in the amount of \$200,000; and Mote Marine Laboratory for in-kind match in the amount of \$210,273 for land-based work and \$183,407 for Acropora nursery work.

Appendix 4: Active permits for both land-based and nursery work from the Florida Keys National Marine Sanctuary, Florida Fish and Wildlife Conservation Commission, National Marine Fisheries Service, and National Park Service.

Appendix 5: Negotiated Indirect Cost Recovery Agreements for The Nature Conservancy, Mote Marine Laboratory, and Florida Fish and Wildlife Conservation Commission. Please note that both TNC and Mote have submitted their most recent NICRAs but are in the process of negotiating new ones. The rates used in this proposal for both organizations are those that are expected to be in the new agreements (15.03% on all direct costs for TNC; 75% of salary and fringe for Mote).

Appendix 6: Letters of support. The first is a Resolution passed by the Florida Keys National Marine Sanctuary Advisory Council on July 9, 2013 in favor of supporting this project for RESTORE and other funds. Other support letters are from the National Marine Fisheries Service, National Park Service, National Oceanic and Atmospheric Administration Restoration Center, and Florida Keys National Marine Sanctuary.

Appendix 1. Detailed Project Plans

Offshore Nurseries - Acropora Restoration

Primary Activities

The ultimate goal of the project is to restore breeding populations of keystone coral species to degraded coral reefs throughout Monroe County. Large-scale outplanting of genetically distinct colonies will increase the likelihood of successful cross-fertilization and larval settlement on critical habitat within and between restoration sites.

Nursery Operations. Nurseries were installed and stocked through previously-funded projects starting in 2004. Under American Recovery and Reinvestment Act (ARRA) funding, each regional nursery collected from 20 wild donor colonies within the region. Genetic identity of all 20 of those colonies was established. Additionally, nursery managers were authorized to collect fragments of opportunity, defined as fragments found in the wild that are unlikely to survive there (i.e. broken pieces in sand that are unlikely to reattach to hard substrate, live tips of colonies on a dead base, etc.). No new collections from live wild colonies are planned, but all nursery managers will be authorized to assess fragments of opportunity and either reattach them to nearby substrate or bring them to the nursery for triage and future fragmentation. This allows us to save colonies that would otherwise be lost in the wild, and increase the genetic diversity in the nurseries without taking tissue from live colonies.

Throughout the life of the project, existing nurseries will be maintained. Day-to-day nursery maintenance includes cleaning coral attachment points, removing predators, and fragmenting corals as they become too large for their mounting structures. New structures will be added to the nursery as needed to support the growth of nursery corals. Each manager will be responsible for maintaining an accurate nursery inventory that indicates when corals were created or lost, and why. Maintenance requirements differ based on nursery size and design, season, and disturbance event frequency (i.e. storms, bleaching conditions, disease outbreaks) so maintenance schedules are determined by each individual nursery manager based on the needs of their nursery.

Table 4. Current nursery inventory.

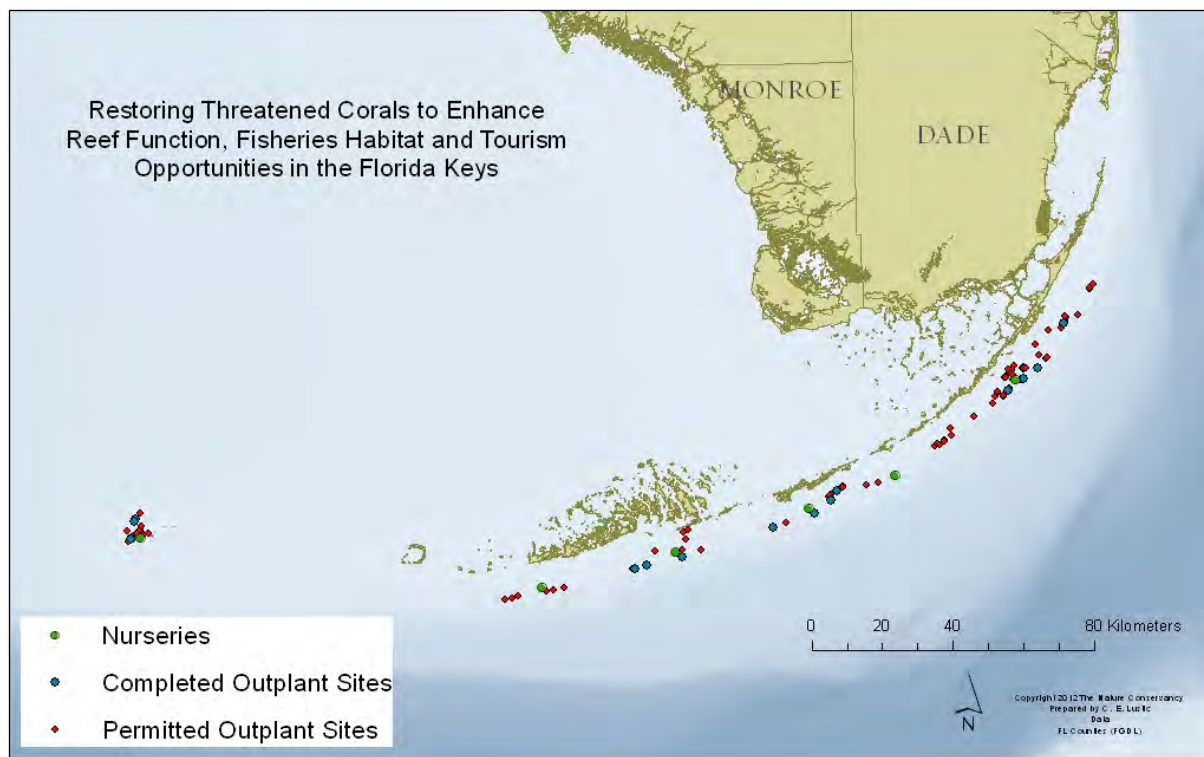
Nursery	Manager	# of genotypes	# of colonies	Nursery designs
Upper Keys	Coral Restoration Foundation	97	30,000	Block, line, tree
Middle Keys	Florida Fish and Wildlife Conservation Commission	15	1,400	Block, line, tree
Lower Keys	Mote Marine Laboratory	48	10,500	Block, line, tree
Dry Tortugas	TNC – Florida Keys Office	13	300	Block
TOTAL		162	42,200	

Outplanting. The main focus of this project is to move large numbers of coral fragments from the nurseries onto the natural reef. Outplanting sites will be completed in accordance with basic outplanting guidelines that the project team developed in conjunction with the National Oceanic and Atmospheric Administration (NOAA) Habitat Restoration Center, Florida Fish and Wildlife Conservation Commission (FWC), FKNMS, and National Park Service (NPS). Some sites will

be outplanted using slightly different methods and be used to implement effectiveness monitoring to feed back into adaptive management and increased project performance.

Corals are transported to the outplant site in coolers of seawater to help limit stress associated with being handled. The fragments are secured to the substrate using one of three proven methods: 1) a coral fragment may be secured with epoxy to the substrate; 2) a coral fragment may be left on the puck that it was attached to in the nursery and the puck may be secured to the substrate with epoxy; or 3) a small masonry nail may be driven into the substrate and the coral fragment secured at the base with epoxy and secured to the nail with zipties. All three of these methods have been used successfully in the past and the coral eventually grows over the attachment method in all cases (Johnson et al., 2011).

Each site will be mapped for monitoring, which will include assessments of survivorship and condition including predation, disease, and bleaching. In conjunction with monitoring, maintenance at the outplanting sites will include removal of coral-eating snails and worms, reattachment of broken fragments, and disease and algal overgrowth management as necessary.



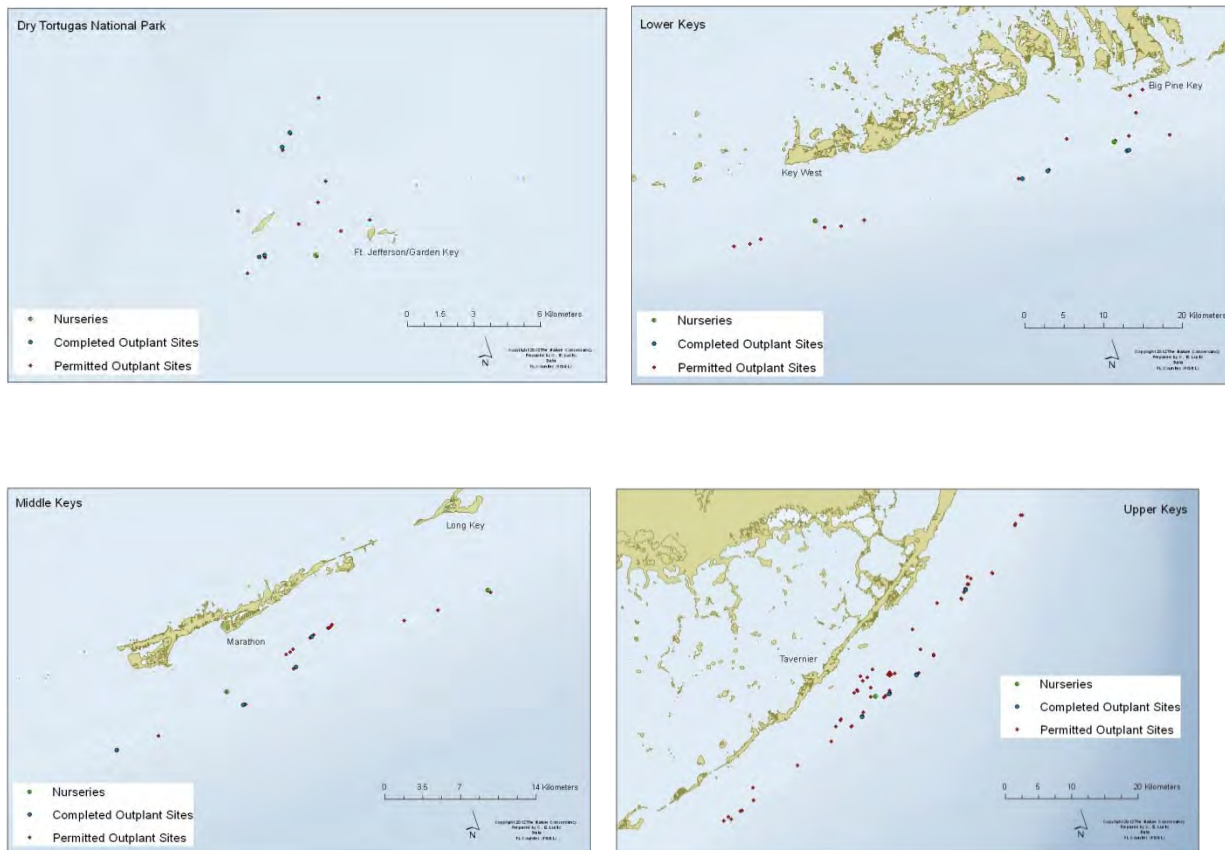


Figure 8. Nursery and outplant maps for Monroe County.

Outplanting Design.

Health Criterion. Each fragment in the nursery is evaluated prior to outplanting to ensure that only colonies that present a visual suggestion of good health are placed out on the reef.

Methods. Several methods for outplanting corals have been field-tested and proven both efficient and successful. Any of those methods, or a combination, may be used when outplanting corals for this project. These methods include:

- 1) On a cement puck or disk that is securely fastened to the substrate.
- 2) Securely fastened to a nail that is driven into the substrate
- 3) Securely fastened directly to the substrate

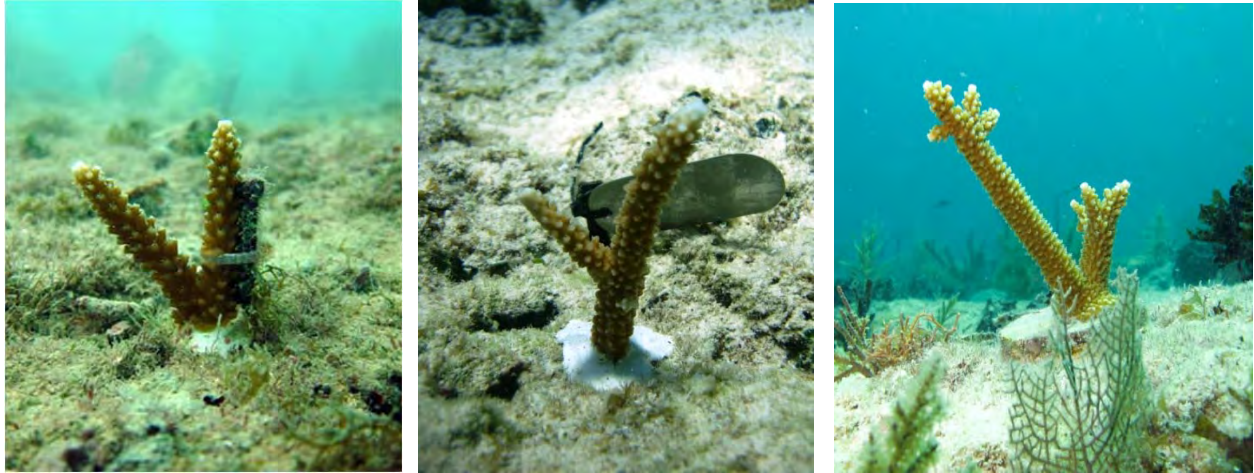


Figure 9. Outplanting methods: On a nail with epoxy at the base; epoxied straight to the substrate; on a puck epoxied to the substrate.

Site Selection. Site selection is highly region-specific and each region has worked with local regulators to choose appropriate sites. Some general guidance includes:

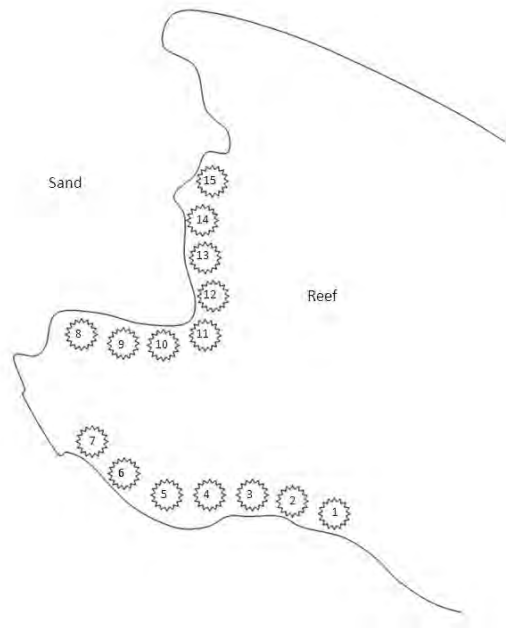
- 1) Suitable reef habitat and/or historic presence of the species (in recent decades)
- 2) Healthy environment for the given region
- 3) Not within any permitted marine and coastal construction areas (i.e. dredging, beach nourishment projects, etc.)

Outplanting Design. Basic guidance for the outplant sites include:

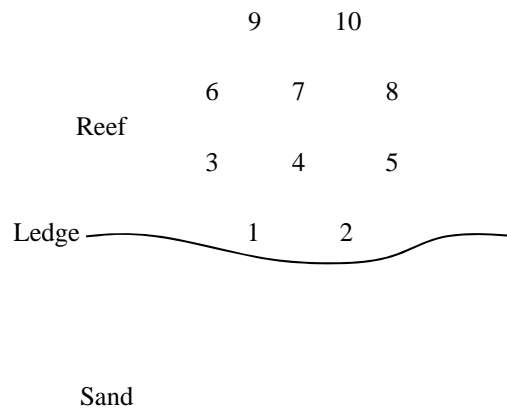
- 1) Avoid dominance of one genotype at each site
- 2) Maximize the diversity of genotypes from the available stock
- 3) Outplant at a diversity of sites to minimize risk
- 4) Allow for some manipulation of site design to allow for research

EXAMPLE of outplanting site design

Fifteen outplanting arrays situated along a reef edge.



Each array is comprised of 10 colonies arranged in a cluster, with one representative from each of 10 genotypes per array.



Secondary Activities

Rescue nurseries. A noteworthy ancillary benefit of this project is the opportunity to maintain existing rescue nurseries for *Acropora* and other important species of stony corals. Due to hurricanes and increasing numbers of boat groundings and coastal construction projects that

impact corals, local management agencies have identified a need for nurseries to provide a home for rescued or damaged corals of all species. Our existing nurseries provide assistance to management agencies in damage response and assessment efforts following boat groundings and natural disturbance events.

Advancing the science of restoration. In addition to the main goals of species recovery and on-the-ground habitat restoration, TNC and partners are interested in conducting manipulative experiments in the nurseries and/or at outplant sites to continue to advance the science of reef restoration. One particular area of critically needed research is developing restoration approaches that maximize the long term survival of outplanted corals. Such experiments will require intensive monitoring at a level above that which is generally conducted for restoration projects. Potential research projects include studying the leading causes of mortality, including predation, bleaching, and disease. Other research questions may address optimal size, density, and microenvironment of outplanted corals with an objective of maximizing survivorship.

Nurseries and outplant sites as research platforms. Over the course of this program, many scientific collaborators have conducted research either in the nurseries or by taking small samples from the nursery corals for laboratory analysis. These projects benefit the scientists because it has been easier to get permits to take samples from nursery stock than from wild stock, they benefit the permitting agencies because they do not have to authorize sampling from wild colonies and they benefit the project because the studies generally answer questions that help advance the science of nursery-rearing, outplanting, or *Acropora* recovery in general.

Land-Based Nurseries – Boulder Coral Restoration

Great star coral (*Montastrea cavernosa*) and mountainous star coral (*Montastrea faveolata*), two important boulder coral species in the Florida Keys, were highly impacted by the 2010 cold water anomaly, particularly in nearshore environments. Some sites in the Lower Keys experienced more than a 95% decline in *Montastrea faveolata* and a significant decline in *Montastrea cavernosa*. *Montastrea faveolata* is currently being considered for listing as endangered under the Endangered Species Act.

A new concept called microfragmenting is now being used to ‘reskin’ dead coral skeleton. Microfragmenting is designed to optimize the skinning or sheeting effect that juvenile corals display and has shown promise in restoring large dead coral heads, rather than outplanting new juvenile corals and waiting a century for them to grow to the size of the corals that have been lost. Microfragments can be produced quickly and efficiently, making this a viable option for ecosystem restoration efforts.

Primary Activities

Nursery culture. Restoration of *Montastrea cavernosa* and *Montastrea faveolata* will be completed using a combination of land-based (indoor and outdoor tanks/raceways) and field-based environments (offshore nurseries and outplant sites), and will result in the planting of approximately 10,000 coral fragments per year onto 1,000 dead coral heads on Lower Keys reefs. On average, over 1,000 new fragments will be cut per month and subsequently housed in

indoor aquarium systems. Here fragments will heal for a period of 2 weeks to one month before they are moved to outdoor raceways for another 3-4 months in order to acclimate to natural conditions and begin to grow to the desired size. These outdoor raceways have capacity for 1,000 fragments each. With more than 5 raceways in operation now and 5 more being assembled, the Mote Lab will have more than enough space to accommodate the proposed yearly crop of fragments.

Once sufficient growth has been achieved, fragments will be moved to the offshore nursery site after an assessment of health via a thorough veterinary inspection. This process has been sanctioned by the Florida Keys National Marine Sanctuary and has been used to outplant laboratory-raised corals for the past 3-4 years. Until recently, corals in the field-based nursery were grown successfully on cinder blocks; however, better growth and survival have been achieved on an experimental scale on coral trees similar to those used for *Acropora* propagation. These structures will serve as temporary field acclimation sites immediately prior to outplanting. Corals will adapt to ocean conditions and finish growing to size for at least one month prior to outplanting.

Outplanting. A total of approximately 10,000 coral fragments will be outplanted annually to coral skeletons or old coral head mounds in groups of ten. Each fragment in a single group will be produced from the same broodstock colony to ensure compatibility when the fragments grow to contact one another. Upon outplant, each fragment planted within the group will grow independently of one another until all fragments eventually merge, forming one large colony rather than multiple small ones. When fragments have completely merged they will cover over a minimum of 650 cm² of vacant coral substrate. We estimate that this will be achieved in as little as 2-3 years after outplant, which is significant because it can take upwards of 20 years to achieve this colony size from one individual wild colony.

Secondary Activities

Pigeon Key facility. The Pigeon Key facility will be used to set up two additional land-based raceways in which about 2,000 fragments will be created per year. The raceways will be used to propagate corals in a public setting where students, summer campers and the general public can learn and see first-hand the coral restoration process. The raceways at Pigeon Key will be installed during the first half of year 1 and are not calculated into the full production and outplanting numbers for year 1 but will contribute to outplantings in years 2 and 3.

Appendix 2. Partner Budgets

The Coral Restoration Foundation, Inc - YEAR 1

**PROJECTED BUDGET TEMPLATE
COMMUNITY-BASED HABITAT RESTORATION PROJECT**

YEAR ONE BUDGET CATEGORIES	THIRD PARTY REQUESTED RESTORE FUNDS	THIRD PARTY MATCH	TOTAL	DESCRIPTION***
Salaries	\$ 70,560.00	\$ -	\$ 70,560.00	
Fringe Benefits (see note 3 below)	\$ 21,168.00	\$ -	\$ 21,168.00	30% fringe includes workman's comp, medical insurance, Social security match, Dan Insurance
Travel	\$ 1,150.00		\$ 1,150.00	
Supplies*	\$ 22,722.00	\$ -	\$ 22,722.00	Includes Air, nursery supplies, outplant supplies, tools, dive supplies
Contractual	\$ -	\$ -		
Other: (Equipment Usage)	\$ 59,400.00	\$ -	\$ 59,400.00	Includes use of boats, SCUBA gear, and trucks
Other: (Volunteers)**	\$ -	\$ 137,500.00	\$ 137,500.00	Approx. 6210.5 hrs of volunteer time at the 2012 national rate of \$22.14/hr
Other: (Specify)	\$ -			
Total Direct Costs	\$ 175,000.00	\$ 137,500.00	\$ 312,500.00	
Indirect Costs (NO more than 15%) - See NOTE 4 below				
TOTALS - See notes 5, 6, & 7	\$ 175,000.00	\$ 137,500.00	\$ 312,500.00	

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery

The Coral Restoration Foundation, Inc - YEAR 2

**PROJECTED BUDGET TEMPLATE
COMMUNITY-BASED HABITAT RESTORATION PROJECT**

YEAR TWO BUDGET CATEGORIES	THIRD PARTY REQUESTED RESTORE FUNDS	THIRD PARTY MATCH	TOTAL	DESCRIPTION***
Salaries	\$ 35,280.00	\$ -	\$ 35,280.00	
Fringe Benefits (see note 3 below)	\$ 10,584.00	\$ -	\$ 10,584.00	30% fringe includes workman's comp, medical insurance, Social security match, Dan Insurance
Travel	\$ 575.00	\$ -	\$ 575.00	
Supplies*	\$ 11,361.00	\$ -	\$ 11,361.00	Includes Air, nursery supplies, outplant supplies, tools, dive supplies
Contractual	\$ -	\$ -		
Other: (Equipment Usage)	\$ 29,700.00	\$ -	\$ 29,700.00	Includes use of boats, SCUBA gear, and trucks
Other: (Volunteers)**	\$ -	\$ 68,750.00	\$ 68,750.00	Approx. 3,105.25 hrs of volunteer time at the 2012 national rate of \$22.14/hr
Other: (Specify)	\$ -			
Total Direct Costs	\$ 87,500.00	\$ 68,750.00	\$ 156,250.00	
Indirect Costs (NO more than 15%) - See NOTE 4 below	=			
TOTALS - See notes 5, 6, & 7	\$ 87,500.00	\$ 68,750.00	\$ 156,250.00	

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost

Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

The Coral Restoration Foundation, Inc - YEAR 3

**PROJECTED BUDGET TEMPLATE
COMMUNITY-BASED HABITAT RESTORATION PROJECT**

YEAR THREE BUDGET CATEGORIES	THIRD PARTY REQUESTED RESTORE FUNDS	THIRD PARTY MATCH	TOTAL	DESCRIPTION***
Salaries	\$ 35,280.00	\$ -	\$ 35,280.00	
Fringe Benefits (see note 3 below)	\$ 10,584.00	\$ -	\$ 10,584.00	30% fringe includes workman's comp, medical insurance, Social security match, Dan Insurance
Travel	\$ 575.00	\$ -	\$ 575.00	
Supplies*	\$ 11,361.00	\$ -	\$ 11,361.00	Includes Air, nursery supplies, outplant supplies, tools, dive supplies
Contractual	\$ -	\$ -		
Other: (Equipment Usage)	\$ 29,700.00	\$ -	\$ 29,700.00	Includes use of boats, SCUBA gear, and trucks
Other: (Volunteers)**	\$ -	\$ 68,750.00	\$ 68,750.00	Approx. 3,105.25 hrs of volunteer time at the 2012 national rate of \$22.14/hr
Other: (Specify)	\$ -			
Total Direct Costs	\$ 87,500.00	\$ 68,750.00	\$ 156,250.00	
Indirect Costs (NO more than 15%) - See NOTE 4 below	=			
TOTALS - See notes 5, 6, & 7	\$ 87,500.00	\$ 68,750.00	\$ 156,250.00	

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost **Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org**
Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

The Coral Restoration Foundation, Inc. - TOTAL PROJECT EXPENSES

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

TOTAL PROJECT BUDGET CATEGORIES	CRF REQUESTED RESTORE FUNDS	CRF MATCH	TOTAL	DESCRIPTION***
Salaries	\$141,120	-	\$141,120	
Fringe Benefits (see note 3 below)	\$42,336	-	\$42,336	30% fringe includes workman's comp, medical insurance, Social security match, Dan Insurance
Travel	\$2,300	-	\$2,300	
Supplies*	\$45,444	-	\$45,444	Includes Air, nursery supplies, outplant supplies, tools, dive supplies
Contractual	-	-	\$0	
Other: (Equipment Usage)	\$118,800	-	\$118,800	Includes use of boats, SCUBA gear, and trucks
Other: (Volunteers)**	-	\$275,000	\$275,000	Approx. 12,421 hrs of volunteer time at the 2012 national rate of \$22.14/hr
Other: (Specify)	-	-		
Total Direct Costs	\$350,000	\$275,000	\$625,000	
Indirect Costs (NO more than 15%) - See NOTE 4 below				
TOTALS - See notes 5, 6, & 7	\$350,000	\$275,000	\$625,000	

* Equipment purchases over \$5,000 per item are not allowable under this RFP.

**You may NOT charge ICR to volunteer time.

***DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.

1) Specify where possible the sources of confirmed match or potential sources of match.

2) Your source of third party match must be non-federal and cannot be used for any other federal grant.

3) Please identify Fringe Benefits rate used in Description.

4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost

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3-Year Workscope for Coral Restoration Foundation, Inc.

Year 1

Maintain the nursery

Outplant 15,200 small (10-20cm), 3,200 medium (20-50cm) and 1,000 large (50-100cm) corals

Monitor outplanted corals

Year 2

Maintain the nursery

Monitor outplanted corals

Year 3

Maintain the nursery

Monitor outplanted corals

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

YEAR ONE BUDGET CATEGORIES	FWRI REQUESTED RESTORE FUNDS	FWRI MATCH	TOTAL	DESCRIPTION***
Salaries	\$37,292	\$30,976	\$ 68,269	
Fringe Benefits (see note 3 below)	\$6,997	\$8,144	\$ 15,140	The fringe rate for the employees being paid by these grant funds is 1.45% + 538 per month for health insurance as mandated by FL legislature starting 1/1/14, fringe for Kerry Maxwell is 26.29%
Travel	\$1,667	\$0	\$ 1,667	for conference travel to exchange research findings
Supplies*	\$10,015	\$0	\$ 10,015	10K per year in expense for outplanting supplies, nursery maintenance, dive gear, boat and vehicle maintenance, boat launch fees
Contractual				
Other: (air fills)	\$2,000	\$0	\$2,000	
Total Direct Costs	\$57,971	\$39,120	\$97,091	
Indirect Costs (NO more than 15%) - See NOTE 4 below	\$8,696	\$27,565	\$36,261	Third-Party matched indirect is FWC's negotiated rate on matched direct (\$14,611.21) plus the unrecovered indirect on the Third-Party Requested NOAA funds: \$57,955.89*.3735=\$21,646.53; \$21,646.53-\$8,710.77=\$12,935.76; matched indirect is therefore \$14,611.21+\$12,935.76: \$27,546.96.
TOTALS - See notes 5, 6, & 7	\$66,667	\$66,685	\$133,351	

* Equipment purchases over \$5,000 per item are not allowable under this RFP.

**You may NOT charge ICR to volunteer time.

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- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery rate that is based upon either a) a negotiated indirect cost rate agreement with the U.S. government (NICRA) or b) a documented methodology for recovering indirect costs. The difference in the organization's approved ICR and the max allowed and the 15% can be counted towards the Third Party Match. Please make sure you explain in your description how you arrived at your match ICR. ****You may NOT charge ICR to volunteer time.**

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	salary per year at 19 per hr- 40 hr for 52 weeks	salary per year at 20 per hr- 40 hr for 52 weeks	fringe plus salary	fringe
	39,520.00	41,600.00	\$ 37,833.23	\$ 540.74
health care for 36 month s				fringe plus health care \$ 6,996.74
6456				

To calculate match indirect
\$ 21,652.13 \$ 14,611.21
\$12,956
\$14,609

FISH AND WILDLIFE RESEARCH INSTITUTE - KERRY MAXWELL - YEAR 2

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

YEAR TWO BUDGET CATEGORIES	FWRI REQUESTED RESTORE FUNDS	FWRI MATCH	TOTAL	DESCRIPTION***
Salaries	\$37,292	\$30,976	\$ 68,269	
Fringe Benefits (see note 3 below)	\$6,997	\$8,144	\$ 15,140	The fringe rate for the employees being paid by these grant funds is 1.45% + 538 per month for health insurance as mandated by FL legislature starting 1/1/14, fringe for Kerry Maxwell is 26.29%
Travel	\$1,667	\$0	\$ 1,667	for conference travel to exchange research findings
Supplies*	\$10,015	\$0	\$ 10,015	10K per year in expense for outplanting supplies, nursery maintenance, dive gear, boat and vehicle maintenance, boat launch fees
Contractual				
Other: (air fills)	\$2,000	\$0	\$2,000	
Other: (Volunteers)**				
Total Direct Costs	\$57,971	\$39,120	\$97,091	
Indirect Costs (NO more than 15%) - See NOTE 4 below	\$8,696	\$27,565	\$36,261	Third-Party matched indirect is FWC's negotiated rate on matched direct (\$14,611.21) plus the unrecovered indirect on the Third-Party Requested NOAA funds: \$57,955.89*.3735=\$21,646.53; \$21,646.53-\$8,710.77=\$12,935.76; matched indirect is therefore \$14,611.21+\$12,935.76: \$27,546.96.
TOTALS - See notes 5, 6, & 7	\$66,667	\$66,685	\$133,351	

* Equipment purchases over \$5,000 per item are not allowable under this RFP.

**You may NOT charge ICR to volunteer time.

***DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.

1) Specify where possible the sources of confirmed match or potential sources of match.

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3) Please identify Fringe Benefits rate used in Description.

4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery

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FISH AND WILDLIFE RESEARCH INSTITUTE - KERRY MAXWELL - YEAR 3

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

YEAR 3 BUDGET CATEGORIES	FWRI REQUESTED RESTORE FUNDS	FWRI MATCH	TOTAL	DESCRIPTION***
Salaries	\$37,292	\$30,976	\$ 68,269	
Fringe Benefits (see note 3 below)	\$6,997	\$8,144	\$ 15,140	The fringe rate for the employees being paid by these grant funds is 1.45% + 538 per month for health insurance as mandated by FL legislature starting 1/1/14, fringe for Kerry Maxwell is 26.29%
Travel	\$1,667	\$0	\$ 1,667	for conference travel to exchange research findings
Supplies*	\$10,015	\$0	\$ 10,015	10K per year in expense for outplanting supplies, nursery maintenance, dive gear, boat and vehicle maintenance, boat launch fees
Contractual	\$0	\$0	\$0	
Other: (air fills)	\$2,000	\$0	\$2,000	
Other: (Volunteers)**	\$0	\$0	\$0	
Total Direct Costs	\$57,971	\$39,120	\$97,091	
Indirect Costs (NO more than 15%) - See NOTE 4 below	\$8,696	\$27,565	\$36,261	Third-Party matched indirect is FWC's negotiated rate on matched direct (\$14,611.21) plus the unrecovered indirect on the Third-Party Requested NOAA funds: \$57,955.89*.3735=\$21,646.53; \$21,646.53-\$8,710.77=\$12,935.76; matched indirect is therefore \$14,611.21+\$12,935.76: \$27,546.96.
TOTALS - See notes 5, 6, & 7	\$66,667	\$66,685	\$133,351	

* **Equipment purchases over \$5,000 per item are not allowable under this RFP.**

****You may NOT charge ICR to volunteer time.**

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

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FISH AND WILDLIFE RESEARCH INSTITUTE - KERRY MAXWELL TOTAL PROJECT EXPENSES

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

TOTAL PROJECT BUDGET CATEGORIES	FWRI REQUESTED RESTORE FUNDS	FWRI MATCH	TOTAL	DESCRIPTION***
Salaries	\$ 111,877	\$ 92,928	\$ 204,806	
Fringe Benefits (see note 3 below)	\$ 20,990	\$ 24,431	\$ 45,421	The fringe rate for the employees being paid by these grant funds is 1.45% + 538 per month for health insurance as mandated by FL legislature starting 1/1/14, fringe for Kerry Maxwell is 26.29%
Travel	\$ 5,000	\$ -	\$ 5,000	for conference travel to exchange research findings
Supplies*	\$ 30,045	\$ -	\$ 30,045	10K per year in expense for outplanting supplies, nursery maintenance, dive gear, boat and vehicle maintenance, boat launch fees
Contractual				
Other: (air fills)	\$ 6,000		\$ 6,000	
Other: (Volunteers)**				
Total Direct Costs	\$ 173,913	\$117,359	\$291,272	
Indirect Costs (NO more than 15%) - See NOTE 4 below	\$26,087	\$82,695	\$108,782	Third-Party matched indirect is FWC's negotiated rate on matched direct (\$43,833.63) plus the unrecovered indirect on the Third-Party Requested NOAA funds: \$173,867.68*.3735=\$64,939.58; \$64,939.58-\$26,132.31=\$38,807.27; matched indirect is therefore \$43,833.63+\$38,807.27: \$82,640.89.
TOTALS - See notes 5, 6, & 7	\$200,000	\$200,054	\$400,054	

amount available per year with 110,000 budgeted	salary per year at 19 per hr- 40 hr for 52 weeks	salary per year at 20 per hr- 40 hr for 52 weeks	fringe plus salary	fringe
\$ 37,292.49	39,520.00	41,600.00	\$ 113,499.68	\$ 1,622.22
healthcare for 36 months				fringe plus health care
19368			\$	20,990.22

To calculate match indirect

\$ 64,956.39 \$ 43,833.63
\$ 38,869.48
\$ 43,825.52

* Equipment purchases over \$5,000 per item are not allowable under this RFP.

**You may NOT charge ICR to volunteer time.

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1) Specify where possible the sources of confirmed match or potential sources of match.

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3) Please identify Fringe Benefits rate used in Description.

4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery

Questions completing this template? Please contact Kathy Day, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lusic - clusic@tnc.org & Kathy Day - kdoy@tnc.org

3-Year Workscope for Fish and Wildlife Research Institute - Kerry Maxwell

Year 1

Maintain the nursery

Outplant 2,400 corals as part of value added research, coral sizes will depend on research question addressed

Monitor outplanted corals

Year 2

Maintain the nursery

Outplant 2,400 corals as part of value added research, coral sizes will depend on research question addressed

Monitor outplanted corals

Year 3

Maintain the nursery

Outplant 2,400 corals as part of value added research, coral sizes will depend on research question addressed

Monitor outplanted corals

MOTE MARINE LABORATORY - DAVE VAUGHAN - YEAR 1
PROJECTED BUDGET TEMPLATE
COMMUNITY-BASED HABITAT RESTORATION PROJECT

YEAR ONE BUDGET CATEGORIES	THIRD PARTY REQUESTED RESTORE FUNDS	THIRD PARTY MATCH	TOTAL	DESCRIPTION***
Salaries	\$ 33,200	\$ 16,667	\$ 49,867	Salaries of Chris Page (40%) and TBD-Technician (40%) for funds and D.Vaughan (20%) as matched
Fringe Benefits (see note 3 below)	\$ 11,952	\$ 6,000	\$ 17,952	Fringe Benefits based on Mote's 36% of salaries for restore funds and matched funds
Travel	\$ 4,000	\$ -	\$ 4,000	Travel to Pigeon Key from Summerland Key
Supplies*	\$ 5,205	\$ -	\$ 5,205	Raceways for Pigeon key and nursery supplies
Vetrinary Certification	\$ 1,000	\$ -	\$ 1,000	Costs for Vetrinarian certification of corals from land to field
Other: (Vessel Usage)	\$ 7,007	\$ 3,333	\$ 10,340	Vessel costs for all field nursery and field outplants
Other: (Volunteers)**	\$ -		\$ -	
			\$ -	
Total Direct Costs	\$ 62,364	\$ 26,000	\$ 88,364	
15% indirect costs applied to Salary and Benefits on reimbursable expenses				Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rate on reimbursable funding at 15% and applying the unrecouped indirect costs as part of their match obligation.
	\$ 6,773	\$ 42,978	\$ 49,751	
TOTALS - See notes 5, 6, & 7	\$ 69,137	\$ 68,978	\$ 138,115	

*** Equipment purchases over \$5,000 per item are not allowable under this RFP.**

****You may NOT charge ICR to volunteer time.**

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery rate that is based upon either a) a negotiated indirect cost rate agreement with the U.S. government (NICRA) or b) a documented methodology for recovering indirect costs. The difference in the organization's approved ICR and the max allowed and the 15% can be counted towards the Third Party Match. Please make sure you explain in your description how you arrived at your match ICR. ****You may NOT charge ICR to volunteer time.**

Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

MOTE MARINE LABORATORY - DAVE VAUGHAN - YEAR 2

**PROJECTED BUDGET TEMPLATE
COMMUNITY-BASED HABITAT RESTORATION PROJECT**

YEAR TWO BUDGET CATEGORIES	THIRD PARTY REQUESTED RESTORE FUNDS	THIRD PARTY MATCH	TOTAL	DESCRIPTION***
Salaries	\$ 33,200	\$ 16,667	\$ 49,867	Salaries of Chris Page (40%) and TBD-Technician (40%) for funds and D.Vaughan (20%) as matched
Fringe Benefits (see note 3 below)	\$ 11,952	\$ 6,000	\$ 17,952	Fringe Benefits based on Mote's 36% of salaries or restore funds and matched funds
Travel	\$ 3,000	\$ -	\$ 3,000	Travel to Pigeon Key from Summerland Key
Supplies*	\$ 2,500	\$ -	\$ 2,500	Raceways for Pigeon key and nursery supplies
Vetrinary Certification	\$ 1,000	\$ -	\$ 1,000	Costs for Vetrinarian certification of corals from land to field
Other: (Vessel Usage)	\$ 7,007	\$ 3,333	\$ 10,340	Vessel costs for all field nursery and field outplants
Other: (Volunteers)**	\$ -		\$ -	
Cash Match (Fury Donations)				
Other: (POR grants match)	\$ -		\$ -	
Total Direct Costs	\$ 58,659	\$ 26,000	\$ 84,659	
15% indirect costs applied to Salary and Benefits on reimbursable expenses				Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rae on riembursable funding at 15% and applying the unrecouped indirect costs as part of their match obligation.
	\$ 6,773	\$ 42,978	\$ 49,751	
TOTALS - See notes 5, 6, & 7	\$ 65,432	\$ 68,978	\$ 134,410	

*** Equipment purchases over \$5,000 per item are not allowable under this RFP.**

****You may NOT charge ICR to volunteer time.**

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost

Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

MOTE MARINE LABORATORY - DAVE VAUGHAN - YEAR 3

**PROJECTED BUDGET TEMPLATE
COMMUNITY-BASED HABITAT RESTORATION PROJECT**

YEAR THREE BUDGET CATEGORIES	THIRD PARTY REQUESTED RESTORE FUNDS	THIRD PARTY MATCH	TOTAL	DESCRIPTION***
Salaries	\$ 33,200	\$ 16,667	\$ 49,867	Salaries of Chris Page (40%) and TBD-Technician (40%) for funds and D.Vaughan (20%) as matched
Fringe Benefits (see note 3 below)	\$ 11,952	\$ 6,000	\$ 17,952	Fringe Benefits based on Mote's 36% of salaries or restore funds and matched funds
Travel	\$ 3,000	\$ -	\$ 3,000	Travel to Pigeon Key from Summerland Key
Supplies*	\$ 2,500	\$ -	\$ 2,500	Raceways for Pigeon key and nursery supplies
Vetrinary Certification	\$ 1,000	\$ -	\$ 1,000	Costs for Vetrinarian certification of corals from land to field
Other: (Vessel Usage)	\$ 7,007	\$ 3,333	\$ 10,340	Vessel costs for all field nursery and field outplants
Other: (Volunteers)**	\$ -		\$ -	
Cash Match (Fury Donations)				
Other: (POR grants match)	\$ -		\$ -	
Total Direct Costs	\$ 58,659	\$ 26,000	\$ 84,659	
15% indirect costs applied to Salary and Benefits on reimbursable expenses				Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rae on riembursable funding at 15% and applying the unrecouped indirect costs as part of their match obligation.
	\$ 6,773	\$ 42,978	\$ 49,751	
TOTALS - See notes 5, 6, & 7	\$ 65,432	\$ 68,978	\$ 134,410	

*** Equipment purchases over \$5,000 per item are not allowable under this RFP.**

****You may NOT charge ICR to volunteer time.**

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost

Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

MOTE MARINE LABORATORY - DAVE VAUGHAN - TOTAL PROJECT EXPENSES

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

TOTAL PROJECT COSTS BUDGET CATEGORIES	MOTE REQUESTED RESTORE FUNDS	MOTE MATCH	TOTAL	DESCRIPTION****
Salaries	\$99,600	\$50,000	\$149,600	Salaries of Chris Page (40%) and TBD-Technician (40%) for funds and D. Vaughan (20%) as matched, per year
Fringe Benefits (see note 3 below)	\$35,856	\$18,000	\$53,856	Fringe Benefits based on Mote's 36% of salaries or restore funds and matched funds
Travel	\$10,000	-	\$10,000	Travel to Pigeon Key from Summerland Key
Supplies*	\$10,205	-	\$10,205	Raceways for Pigeon key and nursery supplies
Contractual	-	-	-	
Veterinary Certification	\$3,000	-	\$3,000	Costs for Vetrinarian certification of corals from land to field
Other: (Vessel Usage)	\$21,021	\$10,000	\$31,021	Vessel costs for all field nursery and field outplants
	-	-	-	
	-	-	-	
Total Direct Costs	\$179,682	\$78,000	\$257,682	
15% indirect costs applied to Salary and Benefits on reimbursable expenses	\$20,318	\$128,934	\$149,252	Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rae on reimbursable funding at 15% and applying the unrecovered indirect costs as part of their match obligation.
TOTALS - See notes 5, 6, & 7	\$200,000	\$206,934	\$406,934	

* **Equipment purchases over \$5,000 per item are not allowable under this RFP.**

** **You may NOT charge ICR to volunteer time.**

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost

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Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

3-Year Workscope for Mote Marine Laboratory - Dave Vaughan

Year 1

Install two raceways at Pigeon Key

Create 10,000 microfragments at Mote and 2,000 microfragments at Pigeon Key

Outplant 10,000 microfragments to 1,000 dead coral heads

Monitor outplanted fragments

Year 2

Create 10,000 microfragments at Mote

Outplant 10,000 microfragments to 1,000 dead coral heads

Monitor outplanted fragments

Year 3

Create 10,000 microfragments at Mote

Outplant 10,000 microfragments to 1,000 dead coral heads

Monitor outplanted fragments

MOTE MARINE LABORATORY - ERICH BARTELS - YEAR 1

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

YEAR 1 BUDGET CATEGORIES	MOTE REQUESTED RESTORE FUNDS	MOTE MATCH	TOTAL	DESCRIPTION***
Salaries	\$67,640	\$0	\$67,640	Project Manager (Erich Bartels), Project Assistant (Cory Walter)
Fringe Benefits (see note 3 below)	\$24,350	\$0	\$24,350	36% of salary (Mote Marine rate)
Travel	\$500	\$0	\$500	
Supplies*	\$840	\$0	\$840	Epoxy, cement, UW paper, etc.
Contractual	\$0	\$0	\$0	
Other: (Equipment Usage)	\$9,540	\$0	\$9,540	Mote vessel usage and SCUBA tank usage costs
Other: (Volunteers)**	\$0	\$6,798	\$6,798	Appox 935 volunteer hrs for life of project (approx 312 hrs/year) based on National Value of Volunteer Time estimated in 2011 as \$21.79/hr
	\$0		\$0	
	\$0		\$0	
Total Direct Costs	\$102,870	\$6,798	\$109,668	
15% indirect costs applied to Salary and Benefits on reimbursable expenses	\$13,799	\$54,346	\$68,145	Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rate on reimbursable funding at 15% and applying unrecouped indirect costs as part of their match obligation.
TOTALS - See notes 5, 6, & 7	\$116,669	\$61,144	\$177,813	

* **Equipment purchases over \$5,000 per item are not allowable under this RFP.**

****You may NOT charge ICR to volunteer time.**

*****DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.**

- 1) Specify where possible the sources of confirmed match or potential sources of match.
- 2) Your source of third party match must be non-federal and cannot be used for any other federal grant.
- 3) Please identify Fringe Benefits rate used in Description.
- 4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery

Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

MOTE MARINE LABORATORY - ERICH BARTELS - YEAR 2

PROJECTED BUDGET TEMPLATE

MONROE COUNTY RESTORE ACT PROJECT

YEAR 2 BUDGET CATEGORIES	MOTE REQUESTED RESTORE FUNDS	MOTE MATCH	TOTAL	DESCRIPTION***
Salaries	\$67,640	\$0	\$67,640	Project Manager (Erich Bartels), Project Assistant (Cory Walter)
Fringe Benefits (see note 3 below)	\$24,350	\$0	\$24,350	36% of salary (Mote Marine rate)
Travel	\$500	\$0	\$500	
Supplies*	\$840	\$0	\$840	Epoxy, cement, UW paper, etc.
Contractual	\$0	\$0	\$0	
Other: (Equipment Usage)	\$9,540	\$0	\$9,540	Mote vessel usage and SCUBA tank usage costs
Other: (Volunteers)**	\$0	\$6,785	\$6,785	Approx 935 volunteer hrs for life of project (approx 312 hrs/year) based on National Value of Volunteer Time estimated in 2011 as \$21.79/hr
	\$0		\$0	
	\$0		\$0	
Total Direct Costs	\$102,870	\$6,785	\$109,656	
15% indirect costs applied to Salary and Benefits on reimbursable expenses	\$13,799	\$54,346	\$68,145	Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rate on reimbursable funding at 15% and applying unrecouped indirect costs as part of their match obligation.
TOTALS - See notes 5, 6, & 7	\$116,669	\$61,131	\$177,800	

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**You may NOT charge ICR to volunteer time.

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1) Specify where possible the sources of confirmed match or potential sources of match.

2) Your source of third party match must be non-federal and cannot be used for any other federal grant.

3) Please identify Fringe Benefits rate used in Description.

4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery

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MOTE MARINE LABORATORY - ERICH BARTELS - YEAR 3

PROJECTED BUDGET TEMPLATE

MONROE COUNTY RESTORE ACT PROJECT

YEAR 3 BUDGET CATEGORIES	MOTE REQUESTED RESTORE FUNDS	MOTE MATCH	TOTAL	DESCRIPTION***
Salaries	\$67,640	\$0	\$67,640	Project Manager (Erich Bartels), Project Assistant (Cory Walter)
Fringe Benefits (see note 3 below)	\$24,350	\$0	\$24,350	36% of salary (Mote Marine rate)
Travel	\$500	\$0	\$500	
Supplies*	\$833	\$0	\$833	Epoxy, cement, UW paper, etc.
Contractual	\$0	\$0	\$0	
Other: (Equipment Usage)	\$9,540	\$0	\$9,540	Mote vessel usage and SCUBA tank usage costs
Other: (Volunteers)**	\$0	\$6,785	\$6,785	Approx 935 volunteer hrs for life of project (approx 312 hrs/year) based on National Value of Volunteer Time estimated in 2011 as \$21.79/hr
	\$0		\$0	
	\$0		\$0	
Total Direct Costs	\$102,863	\$6,785	\$109,649	
15% indirect costs applied to Salary and Benefits on reimbursable expenses	\$13,799	\$54,346	\$68,145	Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rate on reimbursable funding at 15% and applying unrecouped indirect costs as part of their match obligation.
TOTALS - See notes 5, 6, & 7	\$116,662	\$61,131	\$177,793	

* Equipment purchases over \$5,000 per item are not allowable under this RFP.

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1) Specify where possible the sources of confirmed match or potential sources of match.

2) Your source of third party match must be non-federal and cannot be used for any other federal grant.

3) Please identify Fringe Benefits rate used in Description.

4) This RFP allows for reimbursement of up to **15% in indirect costs**. To recover indirect costs under this RFP, the organization must have an indirect cost recovery

Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

MOTE MARINE LABORATORY - ERICH BARTELS - TOTAL PROJECT EXPENSES

**PROJECTED BUDGET TEMPLATE
MONROE COUNTY RESTORE ACT PROJECT**

TOTAL PROJECT BUDGET CATEGORIES	MOTE REQUESTED RESTORE FUNDS	MOTE MATCH	TOTAL	DESCRIPTION***
Salaries	\$202,920	\$0	\$202,920	Project Manager (Erich Bartels), Project Assistant (Cory Walter)
Fringe Benefits (see note 3 below)	\$73,051	\$0	\$73,051	36% of salary (Mote Marine rate)
Travel	\$1,500	\$0	\$1,500	
Supplies*	\$2,513	\$0	\$2,513	Epoxy, cement, UW paper, etc.
Contractual	\$0	\$0	\$0	
Other: (Equipment Usage)	\$28,620	\$0	\$28,620	Mote vessel usage and SCUBA tank usage costs
Other: (Volunteers)**	\$0	\$20,369	\$20,369	Approx 935 volunteer hrs for life of project (approx 312 hrs/year) based on National Value of Volunteer Time estimated in 2011 as \$21.79/hr
	\$0		\$0	
	\$0		\$0	
Total Direct Costs	\$308,604	\$20,369	\$328,973	
15% indirect costs applied to Salary and Benefits on reimbursable expenses	\$41,396	\$163,038	\$204,434	Mote Marine Laboratory has a federally negotiated rate of 75% of salary and fringe. Mote Marine is capping its indirect cost rate on reimbursable funding at 15% and applying unrecouped indirect costs as part of their match obligation.
TOTALS - See notes 5, 6, & 7	\$350,000	\$183,407	\$533,407	

* Equipment purchases over \$5,000 per item are not allowable under this RFP.

**You may NOT charge ICR to volunteer time.

***DESCRIPTION - Provide detail (by budget category) on how the funds requested, or provided as match, will be used to meet the goals of this project.

1) Specify where possible the sources of confirmed match or potential sources of match.

2) Your source of third party match must be non-federal and cannot be used for any other federal grant.

3) Please identify Fringe Benefits rate used in Description.

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Questions completing this template? Please contact Kathy Doy, TNC Sr. Grants Specialist @ kdoy@tnc.org

Please email completed budget to Caitlin Lustic - clustic@tnc.org & Kathy Doy - kdoy@tnc.org

3-Year Workscope for Mote Marine Laboratory - Erich Bartels

Year 1

Maintain the nursery

Outplant 6,000 small (10-20cm), 1,500 medium (20-50cm) and 350 large (50-100cm) corals

Monitor outplanted corals

Year 2

Maintain the nursery

Outplant 4,600 small, 850 medium and 325 large corals

Monitor outplanted corals

Year 3

Maintain the nursery

Outplant 4,600 small, 850 medium and 325 large corals

Monitor outplanted corals

Appendix 3. Letters of Commitment

August 28, 2013

Lisa Tennyson
Office of Management and Budget
Monroe County
1100 Simonton Street
Room 213
Key West, FL 33040

Dear Ms. Tennyson,

The Nature Conservancy is pleased to submit a proposal for funding on behalf of a consortium of Florida Keys-based coral restoration scientists and practitioners titled "Coral Reef Restoration for Environmental and Economic Enhancement of the Florida Keys".

The Nature Conservancy is prepared to commit \$100,000 of cash match in support of this proposal. The source of this cash match is private contributions to our organization.

We look forward to working on this project, and are confident that we will produce significant results.

Sincerely,



Chris Bergh
South Florida Conservation Director
The Nature Conservancy
Florida Keys Office
127 Industrial Road, Suite D
Big Pine Key, Florida
33043



To: Caitlin Lustic, The Nature Conservancy
Ken Nedimyer, The Coral Restoration Foundation, Inc

August 5th, 2013

Catlin,

This is to confirm that the Coral Restoration Foundation Inc is fully committed to participating in the proposed Restore Act Acroporid Coral Restoration project in the Florida Keys. For our part of the project we are proposing to plant approximately 19,400 nursery reared *Acropora cervicornis* corals onto selected offshore coral reefs in the Upper Keys. As part of our commitment we are prepared to offer an in-kind match of approximately 12,421 volunteer hours which translates into a total value of \$275,000.00 towards the project. CRF engages well over a thousand out of town volunteers a year in its coral restoration workshops and dives, and is quite capable of providing sufficient match for the proposed project and for any additional match funding that may be needed.

Sincerely,

A handwritten signature in black ink that reads "Kenneth Nedimyer".

Ken Nedimyer
CRF President



Florida Fish and Wildlife Conservation Commission

Commissioners
Richard A. Corbett
Chairman
Tampa

Brian S. Yablonski
Vice Chairman
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Ronald M. Bergeron
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Aliese P. "Liesa" Priddy
Immokalee

Bo Rivard
Panama City

Charles W. Roberts III
Tallahassee

Kenneth W. Wright
Winter Park

Executive Staff
Nick Wiley
Executive Director
Greg Holder
Assistant Executive Director
Karen Ventimiglia
Chief of Staff

Fish and Wildlife
Research Institute
Gil McRae
Director

(727) 896-8626
(727) 823-0166
FAX

*Managing fish and wildlife
resources for their long-term
well-being and the benefit
of people.*

Fish and Wildlife
Research Institute
South Florida
Regional Laboratory
2796 Overseas Highway,
Suite 119
Marathon, Florida
33050-2296
Voice: (305) 289-2330
Fax: (305) 289-2334
Hearing/speech-impaired:
(800) 955-8771 (T)
(800) 955-8770 (V)
MyFWC.com/Research

August 22, 2013

Caitlin Lustic
The Nature Conservancy
127 Industrial Road, Unit D
Big Pine Key, FL 33043

Dear Ms. Lustic,

The Florida Fish and Wildlife Conservation Commission (FWC) Restoration Ecology Program based in Marathon, Florida is pleased to partner with The Nature Conservancy and other members of the south Florida coral restoration team for the Restore Act funding. The FWC is requesting \$200,000 for our portion of this project. We propose to outplant a minimum of 7,200 corals, a number that is roughly equivalent to the other partner organizations on a cost for outplanted coral bases. We propose to outplant 2,400 corals per year. Additionally, we will provide added value for coral reef restoration by using some outplanted corals to answer research questions aimed at guiding future restoration activities. One particular area of critically needed research is developing restoration approaches that maximize the long term survival of outplanted corals. Such experiments will require intensive monitoring at a level above that which is generally conducted for restoration projects. Coral outplant size will depend on the research question addressed, but will likely be between 10 and 50 cm (total linear length). Potential research projects include studying the leading causes of mortality, including predation, bleaching, and disease. Other research questions may address optimal size, density, and microenvironment of outplanted corals with an objective of maximizing survivorship. The FWC will match it's share of award funds 1:1 with in-kind match in the form of salary and benefits of a full-time state employee, and FWC's unrecovered indirect costs rate on reimbursable expenses.

Sincerely,

John Hunt
Program Administrator



1600 Ken Thompson Pkwy.
Sarasota, FL 34236
Phone: (941) 388-4441
info@mote.org • www.mote.org

Eugene H. Beckstein
Chairman, Board of Trustees
Michael P. Crosby, Ph.D.
President & CEO

Boca Grande Office
PO Box 870
Boca Grande, FL 33921
Phone: (941) 855-9251
BocaGrande@mote.org

Charlotte Harbor Field Station
P.O. Box 529
St. James City, FL 33956
Phone: (239) 283-1622
CHFS-Info@mote.org

Mote Aquaculture Park
12300 Fruitville Road
Sarasota, FL 34240
Phone: (941) 388-4541
MAP-Info@mote.org

**Mote Living Reef Exhibit at
the NOAA Eco-Discovery Center**
35 East Quay Road
Key West, FL 33040
Phone: (305) 296-3551

Punta Gorda Office
1401 Tamiami Trail
Punta Gorda, FL 33950
Phone: (941) 205-3970
PuntaGorda@mote.org

Tropical Research Laboratory
24244 Overseas Highway
Summerland Key, FL 33042
Phone: (305) 745-2729
TRL-Info@mote.org

August 6, 2013

Caitlin Lustic
Coral Recovery Coordinator
The Nature Conservancy
127 Industrial Road, Unit D
Big Pine Key, FL 33043

Dear Ms. Lustic,

I am writing to document the additional support of Mote Marine Laboratory (MML) for the boulder coral restoration portion of the proposal submitted by The Nature Conservancy (TNC). Mote also operates and currently maintains a land-based coral nursery since 2005. Over the past five years the project has made great strides in creating a cache of healthy fragments of the other species of corals including boulder, star and brain corals. In the next few years our focus will include larger scale production and out-planting these nursery grown corals. By placing healthy corals back onto the reef, we hope to restore old coral heads back to life and demonstrate to the public the success of coral reef restoration

As part of the continuing commitment as a second Mote partner on this ongoing project, MML land-based coral restoration will provide additional 1:1 in-kind match from non- federal sources. The in-kind match provided will be as follows: \$68,000.00 in salary and fringe, \$10,000.00 in vessel usage, and \$132,273 of indirect costs (negotiated rate of 75% applied to salary and fringe match expenses and unrecouped indirect costs on reimbursable expenses).

Sincerely,

Dr. David E. Vaughan
Executive Director
Mote Marine Laboratory - Tropical Research Laboratory
24244 Overseas Highway
Summerland Key, FL 33042

A NONPROFIT ORGANIZATION DEDICATED TO ADVANCING THE SCIENCE OF THE SEA AND A MEMBER OF:

Association of Zoos & Aquariums • Association of Marine Laboratories of the Caribbean • Economic Development Council of Sarasota County • Florida Institute of Oceanography • Florida Ocean Alliance
Florida Sea Grant • Greater Sarasota Chamber of Commerce • Gulf of Mexico Coastal Ocean Observing System • International Association of Aquatic & Marine Science Libraries & Information Centers
International Consortium for Marine Conservation • National Association of Marine Laboratories • Science & Environment Council of Sarasota County • Sarasota Arts & Cultural Alliance
Southeast Coastal Ocean Observing Regional Association • Southern Association of Marine Laboratories



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12300 Fruitville Road
Sarasota, FL 34240
Phone: (941) 388-4541
MAP-Info@mote.org

Mote Living Reef Exhibit at
the NOAA Eco-Discovery Center
35 East Quay Road
Key West, FL 33040
Phone: (305) 296-3551

Punta Gorda Office
1401 Tamiami Trail
Punta Gorda, FL 33950
Phone: (941) 205-3970
PuntaGorda@mote.org

Tropical Research Laboratory
24244 Overseas Highway
Summerland Key, FL 33042
Phone: (305) 745-2729
TRL-Info@mote.org

August 5, 2013

Caitlin Lustic
Coral Recovery Coordinator
The Nature Conservancy
127 Industrial Road, Unit D
Big Pine Key, FL 33043

Dear Ms. Lustic,

I am writing to express the support of Mote Marine Laboratory (MML) for the proposal submitted by The Nature Conservancy (TNC) to continue work on the Threatened Coral Recovery and Restoration project. MML has worked with TNC on this project since 2006, and currently maintains a greatly expanded coral nursery in the Lower Keys. Over the past three years the project has made great strides in creating a cache of healthy fragments of the threatened Staghorn coral, *Acropora cervicornis*. In the next few years our focus will turn transplanting these nursery grown corals to numerous outplant sites. By placing healthy corals back onto the reef, we hope to increase the chances of sexual reproduction among the species to encourage natural reseeding of the reefs. Additionally, maintaining the remaining corals in the nursery to ensure that additional fragments will be available for future outplanting requires continued funding.

As part of the continuing commitment as partners on this ongoing project, MML will provide \$183,407.00 of in-kind match from non-federal sources as follows: \$20,369 in approximately 935 volunteer hours and \$165,582.00 in Mote Marine Laboratory's unrecovered indirect costs on reimbursable award funding it receives (equivalent to 34% of Mote's total project budget).

We believe that the efforts that have been made thus far are an important part of protecting and restoring Florida's reefs and the commercially and recreationally important fish species that depend on healthy reef ecosystems, and that the momentum that has been built through the Recovery Act project has garnered growing support on a federal, state, and local level. Mote Marine Laboratory intends to continue its partnership with The Nature Conservancy and fully supports the continuation of this project that will undoubtedly prove to be a crucial component of future coral reef restoration efforts in the Florida Keys.

Sincerely,

Erich Bartels
Staff Scientist
Mote Marine Laboratory - Tropical Research Laboratory
24244 Overseas Highway
Summerland Key, FL 33042

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Association of Zoos & Aquariums • Association of Marine Laboratories of the Caribbean • Economic Development Council of Sarasota County • Florida Institute of Oceanography • Florida Ocean Alliance
Florida Sea Grant • Greater Sarasota Chamber of Commerce • Gulf of Mexico Coastal Ocean Observing System • International Association of Aquatic & Marine Science Libraries & Information Centers
International Consortium for Marine Conservation • National Association of Marine Laboratories • Science & Environment Council of Sarasota County • Sarasota Arts & Cultural Alliance
Southeast Coastal Ocean Observing Regional Association • Southern Association of Marine Laboratories

Appendix 4. Permits



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040

April 17, 2012

Dr. David Vaughan
Mote Marine Laboratory
24244 Overseas Highway
Summerland Key, FL 33042

Dear Dr. Vaughan:

The National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries (ONMS) has approved the issuance of permit number FKNMS-2012-050 to conduct activities within Florida Keys National Marine Sanctuary (sanctuary) for educational purposes. Activities are to be conducted in accordance with the permit application and all supporting materials submitted to the sanctuary, and the terms and conditions of permit number FKNMS-2012-050 (enclosed).

This permit is not valid until signed and returned to the ONMS. Retain one signed copy and carry it with you while conducting the permitted activities. Additional copies must be signed and returned, by either mail or email, to the following individuals within 30 days of issuance and before commencing any activity authorized by this permit:

Scott Donahue
Associate Science Coordinator
Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040
Scott.Donahue@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

Your permit contains specific terms, conditions and reporting requirements. Review them closely and fully comply with them while undertaking permitted activities.

If you have any questions, please contact Joanne Delaney at Joanne.Delaney@noaa.gov. Thank you for your continued cooperation with the ONMS.

Sincerely,

Sean Morton
Superintendent

Enclosure





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040

FLORIDA KEYS NATIONAL MARINE SANCTUARY
EDUCATION PERMIT

Permittee:

Dr. David Vaughan
Mote Marine Laboratory
24244 Overseas Highway
Summerland Key, FL 33042

Permit Number: FKNMS-2012-050

Effective Date: April 17, 2012

Expiration Date: April 16, 2015

Project Title: Mote Living Reef Exhibit at the FKNMS Eco-Discovery Center, Key West

This permit is issued for activities in accordance with the National Marine Sanctuaries Act (NMSA), 16 USC §1431 *et seq.*, and regulations thereunder (15 CFR Part 922). All activities must be conducted in accordance with those regulations and law. No activity prohibited in 15 CFR Part 922 is allowed except as specified in the activity description below.

Subject to the terms and conditions of this permit, the National Oceanic and Atmospheric Administration (NOAA), Office of National Marine Sanctuaries (ONMS) hereby authorizes the permittee listed above to conduct educational activities within Florida Keys National Marine Sanctuary (FKNMS or sanctuary). All activities are to be conducted in accordance with this permit and the permit application received March 22, 2012. The permit application is incorporated into this permit and made a part hereof; provided, however, that if there are any conflicts between the permit application and the terms and conditions of this permit, the terms and conditions of this permit shall be controlling.

Permitted Activity Description & Location:

The following activities are authorized by this permit:

1. Retain scleractinian (stony) coral fragments and whole colonies (hereafter referred to as "corals") of various species and sizes, which were transferred to the permittee by FKNMS staff under previous permit, at the FKNMS Eco-Discovery Center in Key West and Mote Marine Laboratory in Summerland Key, Florida.
2. Collect, transport, and possess corals needing relocation or rescue to the facilities listed in #1, as requested by and only under the direct supervision of FKNMS staff.

No further violation of sanctuary regulations is allowed.



Special Terms and Conditions:

1. Collecting or taking any corals from within the Sanctuary, other than those specimens transferred to the permittee by FKNMS staff under Permitted Activity Description #2 above, is prohibited.
2. The exact species names, numbers of each species, and sizes of each fragment and whole colony must be reported to the FKNMS within 20 days of any given transfer of coral specimens.
3. The permittee must submit the following reports in the time frames given:
 - A. Coral Species List, within 20 days after any given transfer of specimens;
 - B. Coral Condition Report 2012, due April 16, 2013;
 - C. Coral Condition Report 2013, due April 16, 2014;
 - D. Coral Condition Report 2014, due April 16, 2015.

See attached permit report guidelines for a summary of requirements. At a minimum, each report shall include a detailed accounting of all coral specimens authorized for possession under this permit, including the species, size, quantity, current location and final disposition of each specimen (alive and, if so, health condition and size; destroyed and, if so, reason for destruction/mortality and date). These reports shall be submitted to Scott Donahue (Scott.Donahue@noaa.gov), FKNMS Associate Science Coordinator, and Joanne Delaney (Joanne.Delaney@noaa.gov), FKNMS Permit Coordinator.

4. The permittee must hold and maintain a NOAA/FKNMS permit at all times that coral specimens are in his possession.
5. Upon request in writing by the FKNMS Superintendent, the permittee must return coral specimens, or portions thereof, to the sanctuary within 30 days.
6. Coral specimens may not be released or introduced from laboratory culture or exhibit tanks to waters of the Sanctuary without prior approval from the FKNMS Superintendent.

General Terms and Conditions:

1. Within 30 (thirty) days of the date of issuance, the permittee must sign and date this permit for it to be considered valid. Once signed, the permittee must send copies, via mail or email, to the following individuals:

Scott Donahue
Associate Science Coordinator
Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040
Scott.Donahue@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

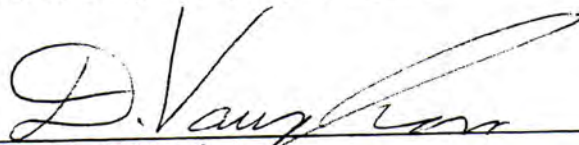


2. It is a violation of this permit to conduct any activity authorized by this permit prior to the ONMS having received a copy signed by the permittee.
3. This permit may only be amended by the ONMS. The permittee may not change or amend any part of this permit at any time. The terms of the permit must be accepted in full, without revision; otherwise, the permittee must return the permit to the sanctuary office unsigned with a written explanation for its rejection. Amendments to this permit must be requested in the same manner the original request was made.
4. All persons participating in the permitted activity must be under the supervision of the permittee, and the permittee is responsible for any violation of this permit, the NMSA, and sanctuary regulations for activities conducted under, or in junction with, this permit. The permittee must assure that all persons performing activities under this permit are fully aware of the conditions herein.
5. This permit is non-transferable and must be carried by the permittee at all times while engaging in any activity authorized by this permit.
6. This permit may be suspended, revoked, or modified for violation of the terms and conditions of this permit, the regulations at 15 CFR Part 922, the NMSA, or for other good cause. Such action will be communicated in writing to the applicant or permittee, and will set forth the reason(s) for the action taken.
7. This permit may be suspended, revoked or modified if requirements from previous ONMS permits or authorizations issued to the permittee are not fulfilled by their due date.
8. Permit applications for any future activities in the sanctuary or any other sanctuary in the system by the permittee might not be considered until all requirements from this permit are fulfilled.
9. This permit does not authorize the conduct of any activity prohibited by 15 CFR § 922, other than those specifically described in the "Permitted Activity Description" section of this permit. If the permittee or any person acting under the permittee's supervision conducts, or causes to be conducted, any activity in the sanctuary not in accordance with the terms and conditions set forth in this permit, or who otherwise violates such terms and conditions, the permittee may be subject to civil penalties, forfeiture, costs, and all other remedies under the NMSA and its implementing regulations at 15 CFR Part 922.
10. Any publications and/or reports resulting from activities conducted under the authority of this permit must include the notation that the activity was conducted under National Marine Sanctuary Permit FKNMS-2012-050 and be sent to the ONMS officials listed in general condition number 1.

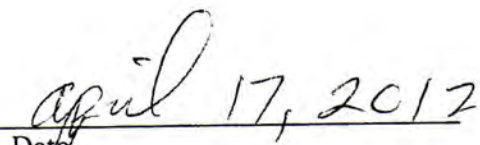


11. This permit does not relieve the permittee of responsibility to comply with all other federal, state and local laws and regulations, and this permit is not valid until all other necessary permits, authorizations, and approvals are obtained. Particularly, this permit does not allow disturbance of marine mammals or seabirds protected under provisions of the Endangered Species Act, Marine Mammal Protection Act, or Migratory Bird Treaty Act. Authorization for incidental or direct harassment of species protected by these acts must be secured from the U.S. Fish and Wildlife Service and/or NOAA Fisheries, depending upon the species affected.
12. The permittee shall indemnify and hold harmless the Office of National Marine Sanctuaries, NOAA, the Department of Commerce and the United States for and against any claims arising from the conduct of any permitted activities.
13. Any question of interpretation of any term or condition of this permit will be resolved by NOAA.


Your signature below, as permittee, indicates that you accept and agree to comply with all terms and conditions of this permit. This permit becomes valid when you, the permittee, countersign and date below. Please note that the expiration date on this permit is already set and will not be extended by a delay in your signing.



Dr. David Vaughan
Mote Marine Laboratory



Date



Sean Morton
Superintendent
Florida Keys National Marine Sanctuary

April 17, 2012

Date

1 document attached.



FLORIDA KEYS NATIONAL MARINE SANCTUARY
RESEARCH & EDUCATION PERMITS

GUIDELINES FOR SUBMITTING PERMIT REPORTS
Coral Condition Report & Parent Colony Report

Please submit all the requested information electronically (MS Word, rich text format, or PDF) to Scott Donahue (Scott.Donahue@noaa.gov) and Joanne Delaney (Joanne.Delaney@noaa.gov).

Permit number:

Date:

Permittee name and contact information (affiliation, address, phone, fax, e-mail):

Type of report:

- ☐ Coral Condition report
- ☐ Parent Colony report

Please briefly describe any deviations from permitted activities.

Please provide a summary report which contains the following information (table or chart is preferable, with photographs where noted):

For Coral Condition report: Update on the condition of all captive coral species collected, including:

- Alive/dead. If mortality observed, report:
 - probable cause of mortality of each colony
 - dates of survival in captivity
- Disease presence/absence. If disease(s) observed, report:
 - suspected disease
 - treatment protocol
 - success of treatment
 - dates of survival in captivity
- New growth (length or weight)
- Any other relevant observations

For Parent Colony report: Update on health/condition of parent coral colonies sampled from in the field, including:

- Labeled photographs of the sampled area on coral colonies* in the following time frames
 - before sampling
 - immediately after sampling
 - six months after the sampling occurs
- Site map with GPS coordinates of the colony such that the colony can be relocated
- Description of the condition of the individual (progress toward recovery).

**number of colonies required for monitoring outlined in permit Special Conditions*



Special Activity License

Florida Fish and Wildlife Conservation Commission
Division of Marine Fisheries Management
620 S. Meridian St., Mail Station 4B3, Tallahassee, Florida 32399-1600
Ph: 850-487-0554 • Fax: 850-487-4847

Issued to: Caitlin Lustic
The Nature Conservancy
P.O. Box 420237
Summerland Key, Florida 33042

License #: SAL-13-1086A-SCRP
Effective Date: 06/13/2013
Expiration Date: 04/08/2014

Authorized Activities:

- 1) Captive-reared staghorn coral (*Acropora cervicornis*) fragments and elkhorn coral (*Acropora palmata*) may be collected from the approved in-water coral nurseries and outplanted to the approved release (outplanting) locations as identified on the maps attached to this license.

Coral fragments may only be outplanted to the release locations within the same county as the in-water coral nursery from where they were collected (e.g., corals collected from an in-water coral nursery located within Broward County shall only be outplanted to the approved release locations within Broward County).

A release authorization is not required prior to outplanting coral fragments collected from the in-water coral nurseries, provided that each fragment meets the Visual Health Assessment criterion established in the attached "Release Protocol for Captive-reared Acroporid Corals."

- 2) Harvest of any species of Corals of Opportunity or COOs (unattached broken coral fragments found laying on the sea floor), and relocate/reattach COOs to substrate within the same county (including approved in-water nurseries) from where they were collected (e.g., COOs collected within Broward County shall only be reattached to substrate within Broward County including approved in-water coral nurseries within Broward County).

Additional authorization may be required for above authorized activities from the Florida Department of Environmental Protection and/or Broward or Dade Counties. Additional authorization is required to conduct any activities within Biscayne National Park or the Florida Keys National Marine Sanctuary.

Licensee Signature Caitlin Lustic Date 6-14-2013

Not valid unless signed. By signature, confirms that all information provided to issue the license is accurate and complete, and indicates acceptance and understanding of the provisions and conditions listed below. **Any false statements or misrepresentations when applying for this license may result in felony charges and will result in revocation of this license.**

Authorized by: Lisa Gregg, OMC II for: Nick Wiley, Executive Director
Authorizing Signature Lisa Gregg Date 6-13-2013

License Conditions and Provisions

Authorized Locations: State waters of Broward, Dade and Monroe Counties, with the following exceptions:

- 1) Corals may only be collected from the approved in-water nursery sites and only released (outplanted) to the approved release locations within the same county as the in-water nursery sites, identified in the attached document “Approved Nursery and Release Locations, SAL-13-1086-SCRIP”.
- 2) Corals of Opportunity (COOs) may only be collected and relocated/reattached to substrate within the same county (including in-water nurseries) and same region (e.g., upper, middle, lower Keys) from where they were collected.
- 3) This license does not authorize any activity outside of state waters.
- 4) This license does not authorize any activity within any state park, unless a research/collecting permit has been obtained from the Florida Department of Environmental Protection, Division of Recreation and Parks.
- 5) This license does not authorize any activity within any federal park, unless a federal park permit has been obtained.
- 6) This license does not authorize any activity within the Florida Keys National Marine Sanctuary (FKNMS), unless a FKNMS permit has been obtained.
- 7) This license does not authorize any activity within any Manatee Limited Entry Area (No Entry or Motorboat Prohibited Zones – list attached to this license).

Purpose: Outplanting of captive-reared marine organisms for stock restoration purposes pursuant to Rule 68B-8, F.A.C.

Law Enforcement Notification: Notification must be made to the nearest FWC Law Enforcement Dispatch Center 24 hours prior to conducting any SAL related activities. An advanced float plan detailing locations, dates, and times of activities shall constitute sufficient notice, provided that authorized personnel do not deviate from the float plan and the float plan is filed with the nearest FWC Law Enforcement Dispatch Center at least 24 hours prior to conducting SAL related activities.

Authorized Personnel: Erich Bartels, Cody Bliss, James Byrne, Nick Corby, Gabriel Delgado, Scott Donahue, Crawford Drury, David S. Gilliam, John Hauk, Jessica Hornbeck, Pam Hughes, John Hunt, Meaghan Johnson, Elizabeth A. Larson, Jessica Levy, Diego Lirman, Caitlin E. Lustic, Kerry Maxwell, Tom Moore, Sean Morton, Ken Nedimyer, Rolando Santos, Stephanie Schopmeyer, Bill Sharp, Cory Walter, Charles J. Walton, as well as members of the media operating under the direct supervision of named authorized personnel.

Authorized Gear:

- 1) Hand collection.
- 2) Hammer and nails, for attaching identification tags and/or outplant fragments to substrate*.
- 3) Marine epoxy and/or cement for attachment of fragments to substrate.
- 4) Bone cutters, wire cutters, and/or needle nose pliers.
- 5) Chisels, and chipping hammers for surface prep.
- 6) Transect lines*.
- 7) Quadrats*.
- 8) Nylon cable ties*.

*Additional permits may be required from the Florida Department of Environmental Protection, Broward or Dade County, Biscayne National Park, or the Florida Keys National Marine Sanctuary for this activity.

Captivity Requirements: All marine organisms (broodstock and captive-bred/captive-reared included) that are targeted for release must be maintained according to the following requirements:

- Treatment Chemicals – Marine organisms targeted for release may not be treated with chemicals such as malachite green, marine ich treatment chemicals, copper sulfate, antibiotics, formalin or anesthetics (MS-222, clove oil, quinaldine, etc), unless use of such chemicals is in compliance with established Food and Drug Administration (FDA) guidelines or are veterinarian-prescribed. This does not include chemicals

used to maintain water chemistry (to control pH, ammonia, or nitrite levels) and does not include vitamins or other nutritional supplements. Chemicals that are not approved by the FDA or prescribed by a veterinarian may not be used on any organisms targeted for release. Any organisms treated with veterinarian-prescribed chemicals may not be released until the withdrawal period specified by the veterinarian has expired.

Health Certification: Prior to the release (outplanting) of captive-reared coral fragments that have been maintained within the in-water coral nurseries, a visual health assessment must be conducted for each fragment following the protocols in the attached “Release Protocol for Captive-reared Acroporid Corals”. The data to be collected and reported are also specified in the attached protocol.

Release Authorization: A Release Authorization is not required prior to release (outplanting) of captive-reared coral fragments from the approved in-water coral nurseries, provided that each fragment meets the Visual Health Assessment criterion established in the attached “Release Protocol for Captive-reared Acroporid Corals.”

Monitoring: Monitoring must be conducted post-outplanting following the attached “Release Protocol for Captive-reared Acroporid Corals”. The data to be collected and reported are also specified in the attached protocol.

Prohibited Activities:

- 1) The following are considered prohibited species and may not be harvested or possessed unless authorized by a Special Activity License issued specifically for activities involving prohibited species:
 - a. Invertebrates: anemone, giant Caribbean (*Condylactis gigantea*), conch, queen (*Strombus gigas*); coral, fire (Genus *Millepora*); coral, hard and stony (Order Scleractinia); live rock (non-aquacultured); sea fan, common (*Gorgonia ventalina*); sea fan, Venus (*Gorgonia flabellum*); starfish, Bahama (*Oreaster reticulatus*); urchin, longspine (*Diadema antillarum*).
 - b. Finfishes: bonefish (Family Albulidae); grouper, Goliath (*Epinephelus itajara*); grouper, Nassau (*Epinephelus striatus*); silverside, key (*Menidia conchorum*); spearfish, longbill (*Tetrapturus pfluegeri*); spearfish, Mediterranean (*Tetrapturus belone*); spearfish, roundscale (*Tetrapturus georgei*); sturgeon (Family Acipenseridae); topminnow, saltmarsh (*Fundulus jenkinsi*).
 - c. Sharks and rays: dogfish, spiny (*Squalus acanthias*); mako, longfin (*Isurus paucus*); ray, manta (Genera *Manta* and *Mobula*); ray, spotted eagle (*Aetobatus narinari*); sand tiger (*Odontaspis taurus*); sand tiger, bigeye (*Odontaspis noronhai*); sawfish, largetooth (*Pristis pristis*); shark, Atlantic angel (*Squatina dumeril*); shark, basking (*Cetorhinus maximus*); shark, bigeye sixgill (*Hexanchus nakamurai*); shark, bigeye thresher (*Alopias vulpinus*); shark, bignose (*Carcharhinus altimus*); shark, Caribbean reef (*Carcharhinus perezii*); shark, Caribbean sharpnose (*Rhizoprionodon porosus*); shark, dusky (*Carcharhinus obscurus*); shark, Galapagos (*Carcharhinus galapagensis*); shark, great hammerhead (*Sphyrna mokarran*); shark, lemon (*Negaprion brevirostris*); shark, narrowtooth (*Carcharhinus brachyurus*); shark, night (*Carcharhinus signatus*); shark, sandbar (*Carcharhinus plumbeus*); shark, scalloped hammerhead (*Sphyrna lewini*); shark, sevengill (*Heptranchias perlo*); shark, silky (*Carcharhinus falciformis*); shark, [bluntnose] sixgill (*Hexanchus griseus*); shark, smalltail (*Carcharhinus porosus*); shark, smooth hammerhead (*Sphyrna zygaena*); shark, tiger (*Galeocerdo cuvier*); shark, whale (*Rhincodon typus*); shark, white (*Carcharodon carcharias*).
- 2) Special Activity Licenses do not authorize any collection of marine mammals or marine turtles. The collection of any other marine organism identified as a Florida Endangered and Threatened Species will be permitted pursuant to the provisions of Chapters 68A-27 and 68B-8, F.A.C.
- 3) Marine organisms harvested pursuant to a SAL may not be sold or consumed unless specified otherwise on this license.
- 4) Third party contractors are limited to conditions specified on the SAL while performing activities requiring the license. No other harvesting activity (recreational or commercial) may be simultaneously conducted while performing activities pursuant to a SAL unless specified otherwise on the license. Please note that any specimens held by a third party contractor awaiting shipment, in quarantine, or at any

location other than the facility a SAL is directly issued to, will not be covered by the SAL if it expires and the third party contractor is still holding the specimens at their facility. Shipment of the specimens must be completed prior to the expiration date of the SAL.

General License Conditions:

- 1) Any authorized personnel conducting activities pursuant to a Special Activity License (SAL) must have a copy of the license signed by both the Commission and the licenseholder, complete with all attachments as specified on the license, in his/her possession while conducting any activities requiring the SAL.
- 2) Special Activity Licenses may be suspended or revoked if authorized personnel listed on the permit have violated FWC rules or policies, terms or conditions of the license, or have submitted false or inaccurate information on their application.
- 3) Special Activity Licenses are non-transferable.

Possession after SAL Expiration: The Commission recognizes that a marine organism collected pursuant to a SAL may need to be retained for a period of time that extends beyond the expiration date of the SAL issued for its harvest. For this purpose, the following conditions must be met for marine organisms collected pursuant to a SAL to be legally possessed beyond the expiration of a SAL:

- 1) All documentation required for reporting must be submitted to the Commission within 30 days of expiration of the SAL.
- 2) Following the expiration date of the SAL, the original SAL or a copy is sufficient documentation to authorize possession of a marine organism harvested pursuant to a SAL. Such documentation must be promptly produced at the request of an authorized law enforcement officer.

Transferability of Marine Organisms: A SAL is not required if a marine organism harvested pursuant to a SAL is being moved through formal transfer or loan between facilities that meet the eligibility requirements in 68B-8.003(1), F.A.C., and are certified aquaculture facilities or are conducting scientific research, education, or exhibition activities. A marine organism authorized for sale under 68B-8.003(11) is not considered a transfer or loan. In lieu of a SAL, documentation must be permanently maintained by a facility that possesses a marine organism harvested pursuant to a SAL and transferred or loaned to that facility. The documentation must include the following:

- 1) A copy of the SAL authorizing the harvest of the marine organism.
- 2) The chain of possession from initial harvest to current possession.
- 3) If the transfer or loan involves a certified aquaculture facility, a copy of the aquaculture facility's valid certification.
- 4) A detailed description of each marine organism being transferred or loaned including common name, scientific name, size, and sex.
- 5) Number of each type of marine organism being transferred or loaned.
- 6) Date of transfer, or beginning and ending date of loan.
- 7) Name, address, and contact person for the transferring facility and for the receiving facility.
- 8) Signatures from representatives of the transferring and receiving facilities acknowledging that the transfer was completed or the loan was initiated.

Reporting Requirements: A Stock Collection and Release SAL holder must submit the following documentation to fulfill reporting requirements:

- 1) Data collection/reporting requirements as specified in the attached "Release Protocol for Captive-reared Acroporid Corals" must be submitted within 30 days of expiration of this license.
- 2) A copy of any publications, technical, monitoring, or final reports that were generated as a result of work conducted pursuant to the SAL. These reports must include the notation that research was conducted pursuant to the specific Commission Special Activity License.

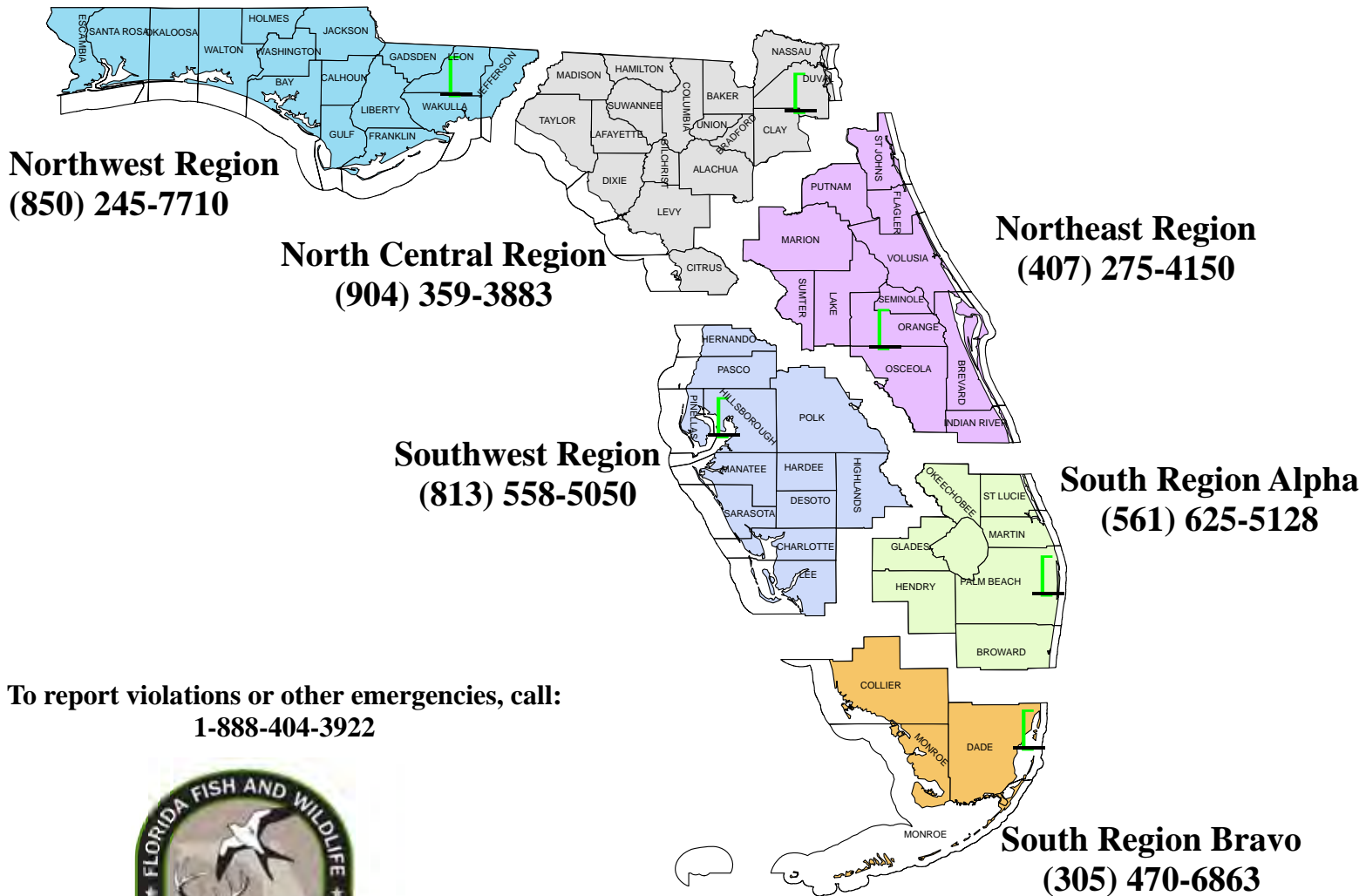
Attachments to Follow:

- FWC Division of Law Enforcement, Special Activity License Notification Locations & Numbers
- Approved Nursery and Outplant Locations, SAL-13-1086-SCRP (6 maps)

- Release Protocol for Captive-reared Acroporid Corals
- Manatee Limited Entry Areas

A person whose substantial interests are affected by FWC's action may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. A person seeking a hearing on FWC's action shall file a petition for hearing with the agency within 21 days of receipt of written notice of the decision. The petition must contain the information and otherwise comply with section 120.569, Florida Statutes, and the uniform rules of the Florida Division of Administration, chapter 28-106, Florida Administrative Code. Upon such notification, the Licensee shall cease all work authorized by this license until the petition is resolved. The enclosed Explanation of Rights statement provides additional information as to the rights of parties whose substantial interests are or may be affected by this action.

FWC Division of Law Enforcement Regional Communication Center Contact Information



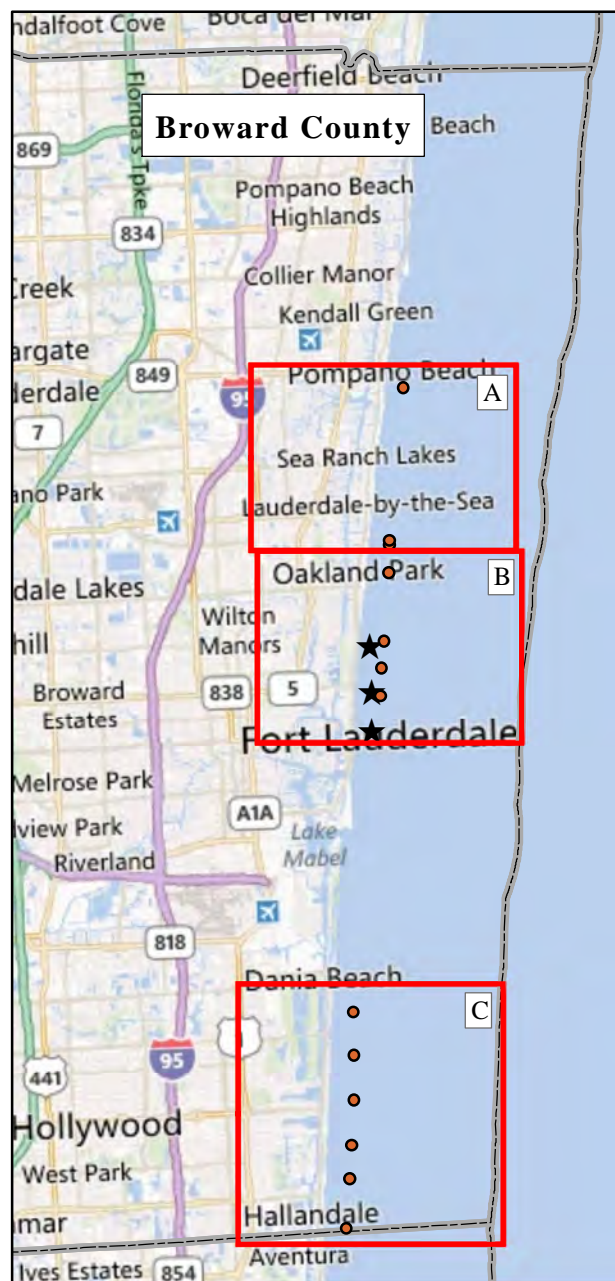
The numbers listed are manned 24 hours daily.
If SAL holders need to provide information via fax, please request the fax number from dispatcher.



0 50 100 200 Miles

The holder of a SAL must notify the nearest Commission Law Enforcement Dispatch Center not later than 24 hours prior to conducting activities under a SAL. Notification may consist of a float plan detailing locations, dates, and times of activities. Deviations from the float plan are permitted only after 24-hour advance notification to the nearest Commission Law Enforcement Dispatch Center. Float plans are valid for the duration of the SAL unless rescinded by the SAL holder.

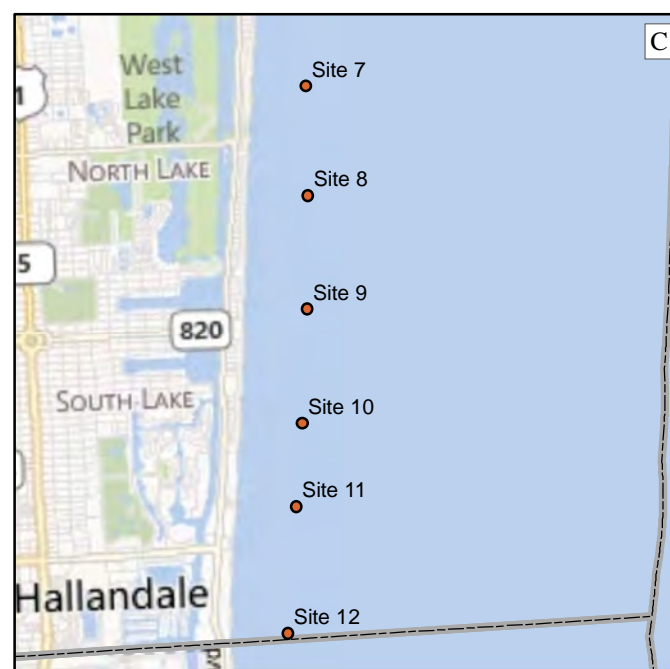
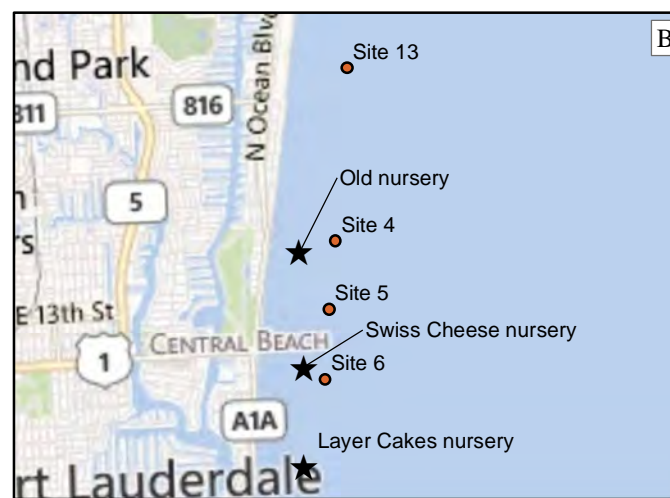
Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Broward County



0 2.25 4.5 9 Miles

Approved Sites*

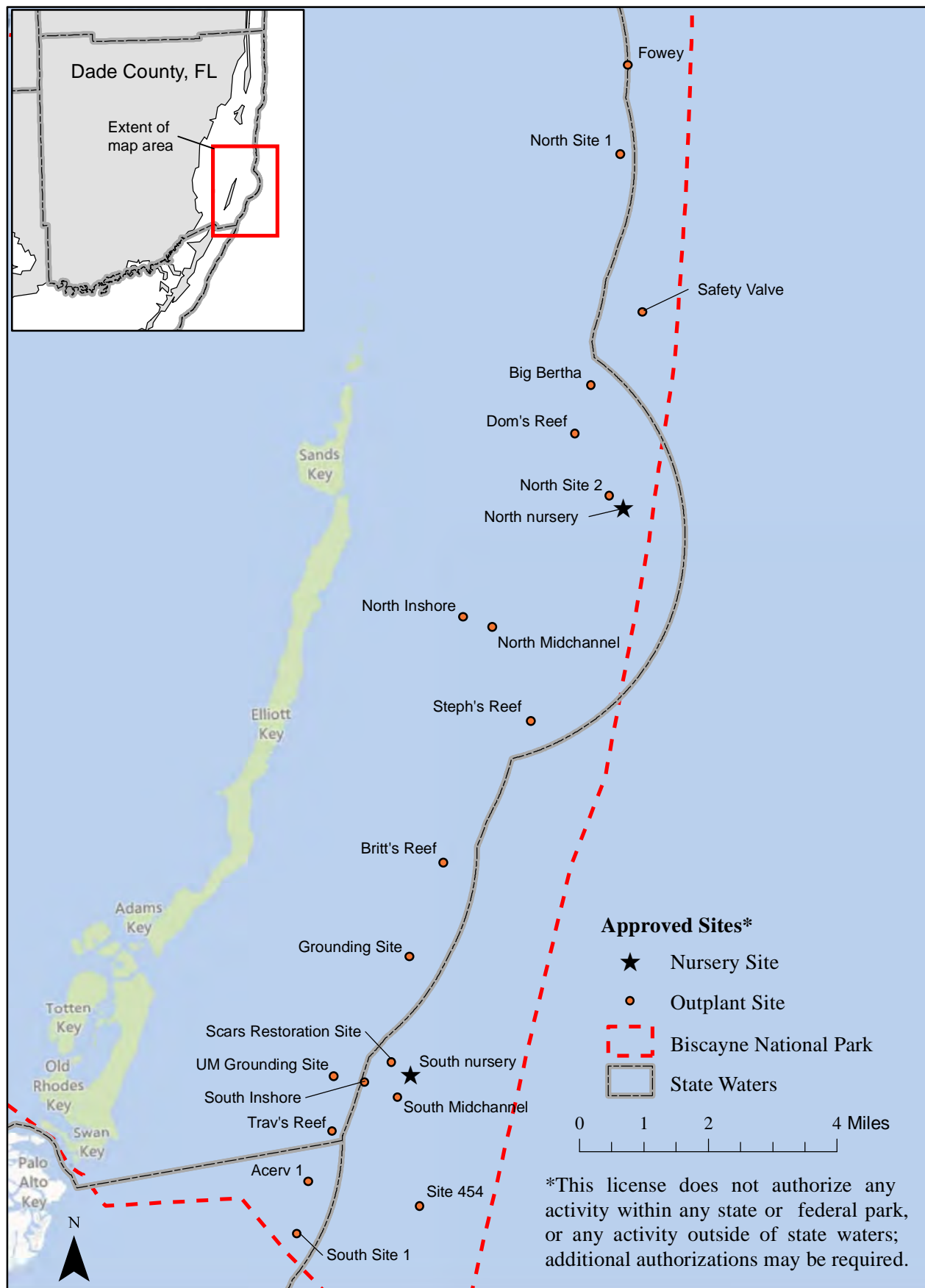
- ★ Nursery Site
- Outplant Site
- County Boundaries



0 1 2 4 Miles

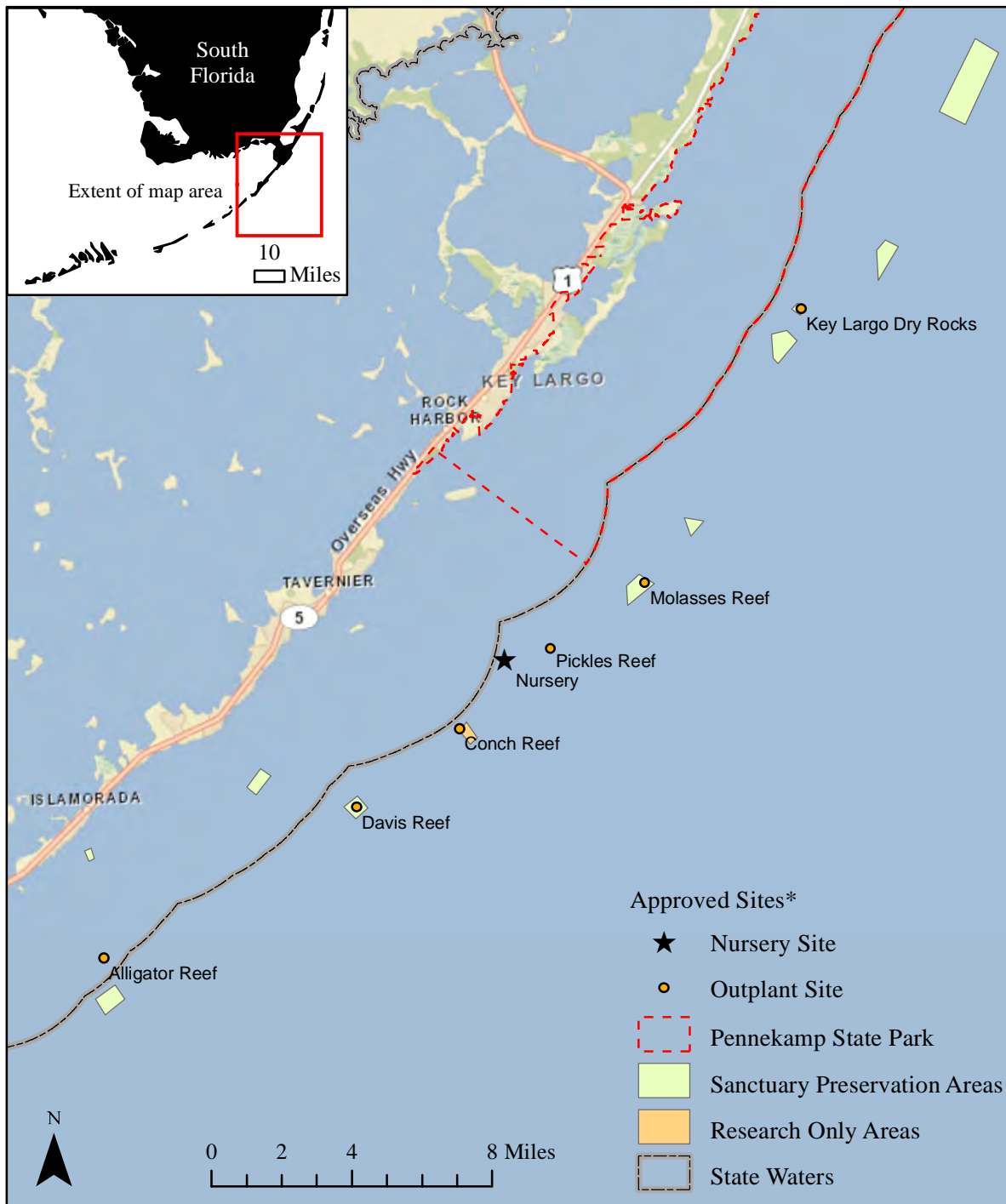
* This license does not authorize any activity within any state or federal park or any activity outside of state waters; additional authorizations may be required.

Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Dade County



Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Upper Keys



*This license does not authorize any activity within John Pennekamp Coral Reef State Park, or within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

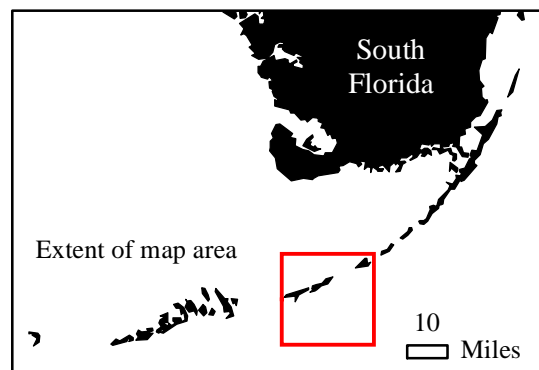
Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Middle Keys



Approved Sites*

- ★ Nursery Site
- Outplant Site
- Sanctuary Preservation Areas
- Research Only Areas
- State Waters



*This license does not authorize any activity within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

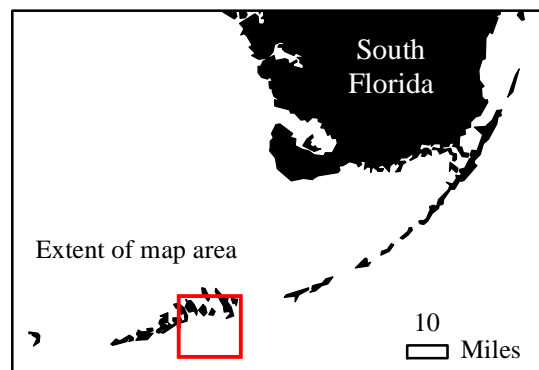
Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Lower Keys



Approved Sites*

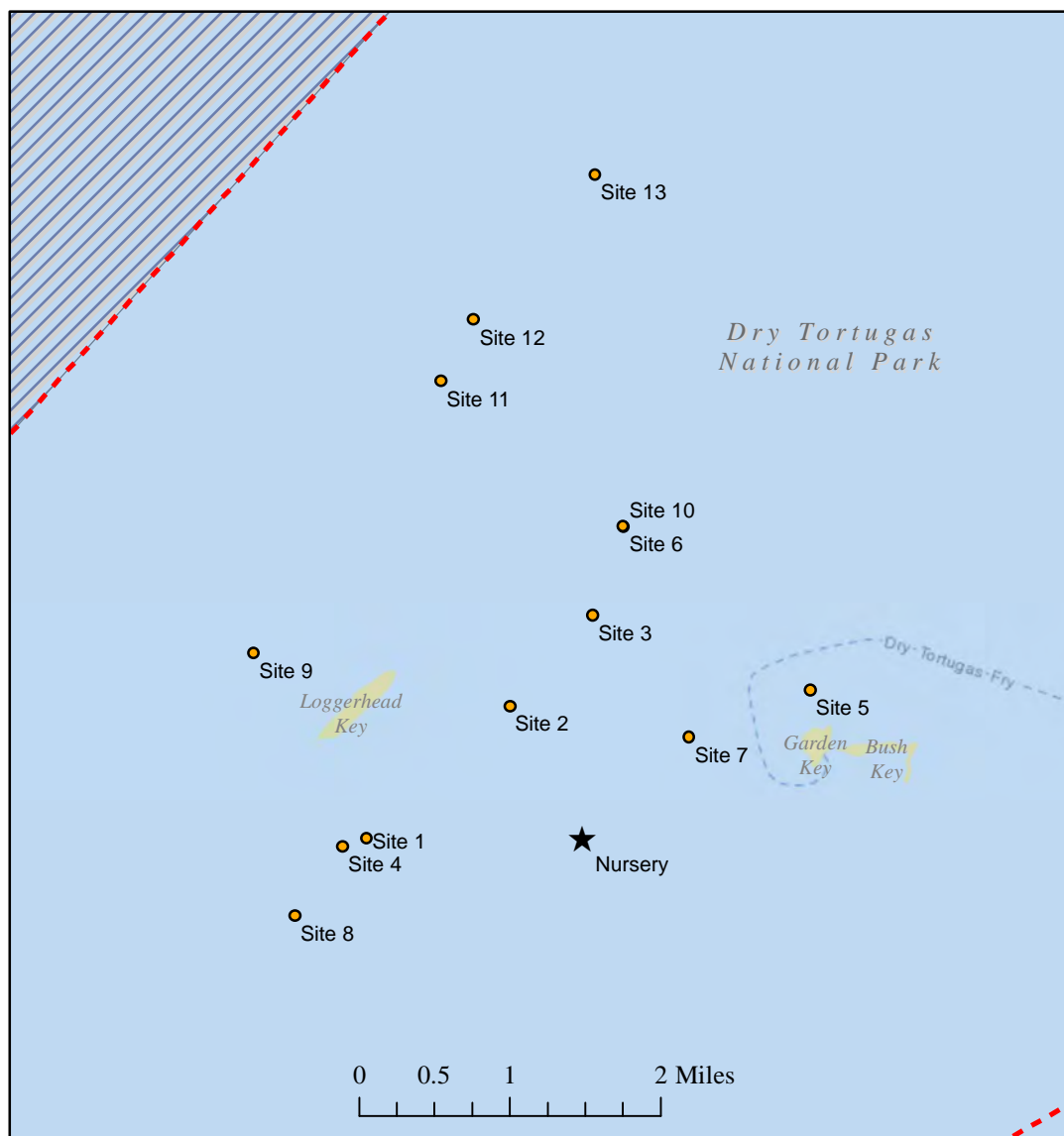
- ★ Nursery Site
- Outplant Site
- Sanctuary Preservation Areas
- Research Only Areas
- State Waters






*This license does not authorize any activity within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

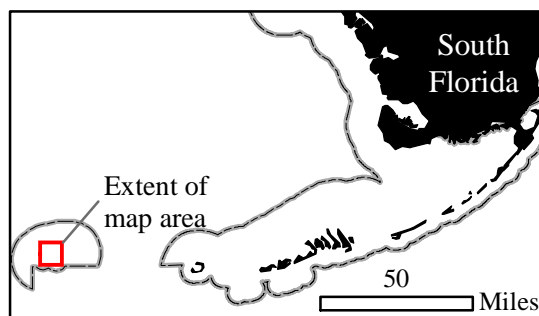
Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Dry Tortugas



Approved Sites*

- ★ Nursery Site
- Outplant Site
-  Ecological Reserves
-  Dry Tortugas National Park
-  State Waters



*This license does not authorize any activity within Dry Tortugas National Park, or within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

Release Protocol for Captive-reared Acroporid Corals

Release Site Selection

Selection of appropriate release sites should meet the following general guidelines:

- 1) Suitable reef habitat and/or historic presence of the species (in recent decades)
- 2) Healthy environment for the given region
- 3) Not within any permitted marine and coastal construction areas (i.e. dredging, beach nourishment projects, etc.), or military exclusion areas.

Definitions

For purposes of this protocol:

- 1) A “donor colony” is defined as any wild coral colony (including super-colony) from which a clipping is harvested for subsequent culture activities.
- 2) A “broodstock fragment” is defined as a coral clipping harvested from a wild donor colony.
- 3) A “nursery colony” is defined as a coral colony that has been reared and raised in the nursery.
- 4) An “outplant fragment/colony” is a fragment from a nursery colony or an entire nursery colony removed from the nursery.

Visual Health Assessment

Each outplant fragment or colony must be visually evaluated prior to outplant to ensure that they appear to be in good health and are free from suspected disease. Each outplant fragment or colony must meet the following criterion prior to outplanting:

- 1) Staghorn coral (*Acropora cervicornis*) fragments must have at least 5 cm (approx. 2”) of linear growth; elkhorn coral fragments must be at least 5 cm (approx. 2”) in diameter.
- 2) Show no visible signs of disease, injury, or active predation based on the presence of:
 - a. Bleaching and/or paling of tissue or other discoloration.
 - b. Recent mortality (denuded skeleton to development of fine “fuzz” on branches indicating mortality within a couple of weeks prior to observation).
 - c. Bearded fireworm, *Hermodice carunculata* or the gastropod *Coralliophila abbreviata* in feeding positions (at tissue loss margin).
 - d. Microbial mat (e.g., black band cyanobacteria and other organisms at tissue loss margin).
 - e. Growth anomalies (altered morphology of tissue and skeleton).

Data Collection

The following data must be recorded prior to outplanting for each nursery genotype represented, and must be reported to the FWC upon expiration of the license:

- 1) Name of original collector.
- 2) Species name.
- 3) Date of collection.
- 4) Original donor colony location information (GPS coordinates, water depth).
- 5) Original donor colony ID number.
- 6) Location of nursery (GPS coordinates, water depth)

The following data must be recorded prior to outplanting for each outplant fragment or colony, and must be reported to the FWC upon expiration of the license:

- 1) Documented verification that suspected disease(s) and active predation was assessed and NOT observed for the outplant fragment or colony, based on the Visual Health Assessment criterion above.
- 2) Fragment or colony ID number.
- 3) Fragment or colony genotype
- 4) Fragment or colony size, in one of the following size classes, defined by total linear extension – 5- 10 cm, 11 – 50 cm, 51 – 100 cm, 101 – 200 cm, anything larger than 201 cm will be estimated to the nearest 100 cm.

Release Protocol for Captive-reared Acroporid Corals

- 5) Representative photos of outplanted corals, including photos of individuals and the landscape, will be taken at each outplant site.
- 6) It is recommended that a comment section be provided on the data collection sheet in the event that the collector wishes to provide any additional information they may deem to be relevant (i.e. water visibility, etc.) at the time of release.

Monitoring Requirements

- 1) Data Collection. The following data must be collected for a representative subset of fragments (defined by 5 outplant fragments or colonies per genotype at each outplant site) at one month and between three and 6 months after release and must be reported to the FWC upon expiration of the license:
 - a. Name of monitoring personnel.
 - b. Species name.
 - c. Date of monitoring event.
 - d. Site name (GPS coordinates).
 - e. Fragment ID number.
 - f. Documented verification that suspected disease(s) and active predation was assessed for the fragment, based on the Visual Health Assessment criterion above.
- 2) Diseased fragments. At each monitoring event, the representative subset of outplant fragments or colonies (see above) will be assessed for disease. If ten or more of these fragments or colonies are identified to be diseased, all of the fragments or colonies at that site will be assessed for disease. Visual health assessment should follow criteria above. A representative set of disease samples shall be preserved for health screening according to the Fixation/Handling of Coral Samples protocol below. If less than ten of these fragments or colonies are identified to be diseased, then this should be noted as part of the monitoring data collected.

Fixation/Handling of Coral Samples

As soon as possible fix the sample(s) using the following fixative ratios:

Ideally a 20:1 (fixative to tissue volume) will be used. At a minimum a 10:1 (fixative to tissue volume) can be used.

- Standard fixative is 5% PFMA (Paraformaldehyde) in 0.1M Phosphate Buffer, pH 7.4.
- 10% formalin (prepared from 37% Formaldehyde) in 0.1M Phosphate Buffer, pH 7.4 may also be used.
- 10% Neutral Buffered Formalin purchased from outside vendors is acceptable.
- 10% seawater formalin (prepared from 37% formaldehyde)

Fix tissue samples on ice or in the refrigerator, as lower temperatures delay autolysis during penetration of the fixative.

Use a sample jar (preferably plastic for ease of shipping and handling) large enough to accommodate the volume of fixative required for the size of the sample. Retain sample until arrangements can be made to ship to a diagnostic laboratory for health screening (TBD).

If immediate fixation is not possible, pack the samples thoroughly and completely **IN ICE (not touching – preferably in plastic bags)** to minimize postmortem changes.

FWC will provide materials for fixation of diseased coral samples.

Notification Requirement

Notification must be made to the FWC if any significant (i.e. ten or more fragments or colonies are identified to be diseased) outbreak is observed at outplant sites. This notification should be in the form of an email to Kerry Maxwell (Kerry.Maxwell@MyFWC.com) with a subject that reads “TNC Outplant Disease Observation”. Kerry Maxwell will arrange transfer of the diseased coral samples to the FWC.

FWC MANATEE PROTECTION NO ENTRY AND MOTORBOATS PROHIBITED ZONES IN EFFECT AS OF OCT. 2009

<u>County</u>	<u>Restriction and Location</u>	<u>Citation in Fla. Admin. Code</u>
Brevard County	<u>No Entry Zones (November 15 – March 31)</u>	
	Reliant (formerly OUC) Power Plant (Indian River)	68C-22.006(2)(a)1., FAC
	FPL Power Plant (Indian River)	68C-22.006(2)(a)2., FAC
	<u>Motorboats Prohibited Zone (Year-round)</u>	
	C-54 Canal (off the Sebastian River)	68C-22.006(2)(b)2., FAC
Broward County	<u>Motorboats Prohibited Zone (November 15 – March 31)</u>	
	Reliant (formerly OUC) Power Plant (Indian River)	68C-22.006(2)(b)1., FAC
	<u>No Entry Zones (Year-round)</u>	
	FPL Port Everglades Power Plant	68C-22.010(1)(a)1., FAC
	FPL Lauderdale Power Plant	68C-22.010(1)(a)2., FAC
Citrus County	<u>No Entry Zones (November 15 – March 31)</u>	
	Blue Waters area of the Homosassa River (2 zones)	68C-22.011(1)(m), FAC
Collier County	<u>No Entry Zone (Year-round)</u>	
	Basin off of Henderson Creek	68C-22.023(1)(a), FAC
Dade County	<u>No Entry Zones (Year-round)</u>	
	Virginia Key Area	68C-22.025(1)(e)1., FAC
	Black Creek Canal	68C-22.025(1)(e)2., FAC
	<u>No Entry Zones (November 15 - April 30)</u>	
	Biscayne Canal	68C-22.025(1)(f)1., FAC
	Little River	68C-22.025(1)(f)2., FAC
	Coral Gables Canal	68C-22.025(1)(f)3., FAC
	<u>Motorboats Prohibited Zone (Year-round)</u>	
	Fisher Island Area	68C-22.025(1)(d), FAC
	<u>No Entry Zone (November 15 - March 31)</u>	
Hillsborough County	TECO-Big Bend Power Plant	68C-22.013(2)(a), FAC
Indian River County	<u>No Entry Zone (November 15 – March 31)</u>	
	Vero Beach Power Plant	68C-22.007(1)(e), FAC
Lee County	<u>No Entry Zone (November 15 – March 31)</u>	
	FPL Tice Power Plant (Orange River)	68C-22.005(2)(a), FAC
Palm Beach County	<u>Motorboats Prohibited Zone (November 15 - March 31)</u>	
	FPL Riviera Beach Power Plant	68C-22.009(1)(e), FAC
Sarasota County	<u>No Entry Zone (Year-round)</u>	
	Pansy Bayou	68C-22.026(2)(c), FAC
	<u>No Entry Zone (November 15 – March 15)</u>	
St. Lucie County	Warm Mineral Springs / Salt Creek	68C-22.026(3)(b), FAC
	<u>No Entry Zone (Year-round)</u>	
	Harbor Branch Canal Basin	68C-22.008(2)(a), FAC
	<u>Motorboats Prohibited Zone (November 15 - March 31)</u>	
Volusia County	Moore's Creek	68C-22.008(2)(b), FAC
	<u>Motorboats Prohibited Zone (October 15 - April 15)</u>	
	Blue Spring	68C-22.012(2)(d), FAC



Special Activity License

Florida Fish and Wildlife Conservation Commission
Division of Marine Fisheries Management
620 S. Meridian St., Mail Station 4B3, Tallahassee, Florida 32399-1600
Ph: 850-487-0554 • Fax: 850-487-4847

Issued to: Christopher A. Page
Mote Tropical Research Lab
24244 Overseas Highway
Summerland Key, FL 33042

License #: SAL-13-1445-SCRP
Effective Date*: 04/01/2013
Expiration Date*: 03/31/2014

* Provided that a valid aquaculture certificate is held by the aquaculture facility. If the aquaculture certificate is not valid, this license is not in effect.

Authorized Activities: The release (outplanting) of captive-reared corals as follows:

- 1) Up to 200 fragments of *Montastrea faveolata* (mountainous star coral) approximately 1.5" in size
- 2) Up to 200 fragments of *Montastrea cavernosa* (great star coral) approximately 1.5" in size
- 3) Up to 60 fragments of *Diploria stringosa* (symmetrical brain coral) approximately 1.5" in size

Authorized Locations: Specific locations in Monroe County as follows:

- 1) Offshore Cook Island, within a 0.10 nm radius of the central coordinate 24.62140° N and 81.36293° W, as authorized pursuant to Florida Keys National Marine Sanctuary permit # FKNMS-2012-151.
- 2) Looe Key National Marine Sanctuary Existing Management Area, within a 0.10 nm radius of the central coordinate 24.56249° N and 81.40003° W; or within a 0.2 nm radius of the central coordinate 24.56277° N and 81.38393° W; or within a 0.2 nm radius of the central coordinate 24.56935° N and 81.38168° W; or within a 0.2 nm radius of the central coordinate 24.55225° N and 81.38393° W, as authorized pursuant to Florida Keys National Marine Sanctuary permit # FKNMS-2012-151.

Licensee Signature _____ Date _____

Not valid unless signed. By signature, confirms that all information provided to issue the license is accurate and complete, and indicates acceptance and understanding of the provisions and conditions listed below. **Any false statements or misrepresentations when applying for this license may result in felony charges and will result in revocation of this license.**

Authorized by: Lisa Gregg, OMC II

for: Nick Wiley, Executive Director

Authorizing Signature _____

Date _____

Lisa Gregg

4-1-2013

License Conditions and Provisions

Purpose: Release (outplanting) of captive-reared marine organisms for scientific research purposes pursuant to Chapter 68B-8, F.A.C.

Law Enforcement Notification: Notification must be made to the nearest FWC Law Enforcement Dispatch Center 24 hours prior to conducting any SAL related activities. An advanced float plan detailing locations, dates, and times of activities shall constitute sufficient notice, provided that authorized personnel do not deviate from the float plan and the float plan is filed with the nearest FWC Law Enforcement Dispatch Center at least 24 hours prior to conducting SAL related activities.

Authorized Personnel: Christopher A. Page, David E. Vaughn

Authorized Gear:

- 1) Brushes for cleaning substrate prior to attachment of fragments.
- 2) Marine epoxy for attachment of fragments to substrate.
- 3) Hammer, nails, and zip ties for attaching identification tags.

In waters of the Florida Keys National Marine Sanctuary (FKNMS), the temporary or permanent placement of any structure or equipment on the sea floor (cages, quadrats, transect lines, tiles, mooring blocks, cinder blocks, settlement plates, etc.), or use of any equipment to alter the sea floor (corers, sediment grabs, dredges, and other sampling devices), must be authorized by the FKNMS. The use of the above gear is authorized pursuant to Florida Keys National Marine Sanctuary permit # FKNMS-2012-151.

Captivity Requirements: All marine organisms (broodstock and captive-bred/captive-reared included) that are targeted for release must be maintained according to the following requirements:

- Containment System Preparation - Prior to the introduction of marine organisms that are targeted for release into a containment system, the system must be thoroughly cleaned (including filter change) to prevent the spread of disease. When adding new organisms to a closed containment system, cleaning is not required if the system previously held, or currently holds, organisms originating from the same genetic unit (or same county if the genetic unit is not known), and the same coast in Florida. When adding new organisms to a flow-through containment system, cleaning is not required if the system previously held or currently holds organisms originating from the same genetic unit or county, and the same coast in Florida into which the water is being discharged.
- Containment System Inhabitants – All marine organisms targeted for release must be maintained with species originating from the same genetic unit (or same county if the genetic unit is not known), and the same coast in Florida.
- Treatment Chemicals – Marine organisms targeted for release may not be treated with chemicals such as malachite green, marine ich treatment chemicals, copper sulfate, antibiotics, formalin or anesthetics (MS-222, clove oil, quinaldine, etc), unless use of such chemicals is in compliance with established Food and Drug Administration (FDA) guidelines or are veterinarian-prescribed. This does not include chemicals used to maintain water chemistry (to control pH, ammonia, or nitrite levels) and does not include vitamins or other nutritional supplements. Chemicals that are not approved by the FDA or prescribed by a veterinarian may not be used on any organisms targeted for release. Any organisms treated with veterinarian-prescribed chemicals may not be released until the withdrawal period specified by the veterinarian has expired.

Health Assessment: Prior to the release of captive-reared coral fragments, a visual health assessment must be conducted for each fragment following the protocols in the attached “Release Protocol for Captive-reared Mountainous Star, Great star and Brain Corals”. The data to be collected and reported are also specified in the attached protocol.

Release Authorization: A Release Authorization is not required prior to outplanting of captive-reared coral fragments, provided that each fragment meets the Visual Health Assessment criterion established in the attached “Release Protocol for Captive-reared Mountainous Star, Great star and Brain Corals”.

Monitoring: Monitoring must be conducted post-outplanting following the attached “Release Protocol for Captive-reared Mountainous Star, Great star and Brain Corals”. The data to be collected and reported are also specified in the attached protocol.

Prohibited Activities:

- 1) The following are considered prohibited species and may not be harvested or possessed unless authorized by a Special Activity License issued specifically for activities involving prohibited species:

- a. Invertebrates: anemone, giant Caribbean (*Condylactis gigantea*), conch, queen (*Strombus gigas*); coral, fire (Genus *Millepora*); coral, hard and stony (Order Scleractinia); live rock (non-aquacultured); sea fan, common (*Gorgonia ventalina*); sea fan, Venus (*Gorgonia flabellum*); starfish, Bahama (*Oreaster reticulatus*); urchin, longspine (*Diadema antillarum*).
 - b. Finfishes: bonefish (Family Albulidae); grouper, Goliath (*Epinephelus itajara*); grouper, Nassau (*Epinephelus striatus*); silverside, key (*Menidia conchorum*); spearfish, longbill (*Tetrapturus pfluegeri*); spearfish, Mediterranean (*Tetrapturus belone*); spearfish, roundscale (*Tetrapturus georgei*); sturgeon (Family Acipenseridae); topminnow, saltmarsh (*Fundulus jenkinsi*).
 - c. Sharks and rays: dogfish, spiny (*Squalus acanthias*); mako, longfin (*Isurus paucus*); ray, manta (Genera *Manta* and *Mobula*); ray, spotted eagle (*Aetobatus narinari*); sand tiger (*Odontaspis taurus*); sand tiger, bigeye (*Odontaspis noronhai*); sawfish, largetooth (*Pristis pristis*); shark, Atlantic angel (*Squatina dumeril*); shark, basking (*Cetorhinus maximus*); shark, bigeye sixgill (*Hexanchus nakamurai*); shark, bigeye thresher (*Alopias vulpinus*); shark, bignose (*Carcharhinus altimus*); shark, Caribbean reef (*Carcharhinus perezii*); shark, Caribbean sharpnose (*Rhizoprionodon porosus*); shark, dusky (*Carcharhinus obscurus*); shark, Galapagos (*Carcharhinus galapagensis*); shark, great hammerhead (*Sphyrna mokarran*); shark, lemon (*Negaprion brevirostris*); shark, narrowtooth (*Carcharhinus brachyurus*); shark, night (*Carcharhinus signatus*); shark, sandbar (*Carcharhinus plumbeus*); shark, scalloped hammerhead (*Sphyrna lewini*); shark, sevengill (*Heptranchias perlo*); shark, silky (*Carcharhinus falciformis*); shark, [bluntnose] sixgill (*Hexanchus griseus*); shark, smalltail (*Carcharhinus porosus*); shark, smooth hammerhead (*Sphyrna zygaena*); shark, tiger (*Galeocerdo cuvier*); shark, whale (*Rhincodon typus*); shark, white (*Carcharodon carcharias*).
- 2) Special Activity Licenses do not authorize any collection of marine mammals or marine turtles. The collection of any other marine organism identified as a Florida Endangered and Threatened Species will be permitted pursuant to the provisions of Chapters 68A-27 and 68B-8, F.A.C.
 - 3) Marine organisms harvested pursuant to a SAL may not be sold or consumed unless specified otherwise on this license.

General License Conditions:

- 1) Any authorized personnel conducting activities pursuant to a Special Activity License (SAL) must have a copy of the license signed by both the Commission and the licenseholder, complete with all attachments as specified on the license, in his/her possession while conducting any activities requiring the SAL.
- 2) Special Activity Licenses may be suspended or revoked if authorized personnel listed on the permit have violated FWC rules or policies, terms or conditions of the license, or have submitted false or inaccurate information on their application.
- 3) Special Activity Licenses are non-transferable.

Reporting Requirements: A Stock Collection and Release SAL holder must submit the following documentation to fulfill reporting requirements:

- 1) “Data Collection” and “Monitoring Requirements” as specified in the attached “Release Protocol for Captive-reared Mountainous Star, Great star and Brain Corals” must be submitted within 30 days of expiration of this license.
- 2) A copy of any publications, technical, monitoring, or final reports that were generated as a result of work conducted pursuant to the SAL. These reports must include the notation that research was conducted pursuant to the specific Commission Special Activity License.

Attachments to Follow:

- Release Protocol for Captive-reared Mountainous Star, Great star and Brain Corals
- FWC Division of Law Enforcement, Special Activity License Notification Locations & Numbers

A person whose substantial interests are affected by FWC’s action may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. A person seeking a hearing on FWC’s action shall file a petition for hearing with the agency within 21 days of receipt of written notice of the decision. The petition must

contain the information and otherwise comply with section 120.569, Florida Statutes, and the uniform rules of the Florida Division of Administration, chapter 28-106, Florida Administrative Code. Upon such notification, the Licensee shall cease all work authorized by this license until the petition is resolved. The enclosed Explanation of Rights statement provides additional information as to the rights of parties whose substantial interests are or may be affected by this action.

Release Protocol for Captive-reared Mountainous Star, Great Star, and Brain Corals

Release Site Selection

Selection of appropriate release sites should meet the following general guidelines:

- 1) Suitable reef habitat and/or historic presence of the species (in recent decades)
- 2) Healthy environment for the given region
- 3) Not within any permitted marine and coastal construction areas (i.e. dredging, beach nourishment projects, etc.), or military exclusion areas.

Definitions

For purposes of this protocol:

- 1) A “donor colony” is defined as any wild coral colony (including super-colony) from which a clipping is harvested for subsequent culture activities.
- 2) A “broodstock fragment” is defined as a coral clipping harvested from a wild donor colony.
- 3) A “nursery colony” is defined as a coral colony that has been reared and raised in the nursery.
- 4) An “outplant fragment/colony” is a fragment from a nursery colony or an entire nursery colony removed from the nursery.

Visual Health Assessment

Each outplant fragment or colony must be visually evaluated prior to outplant to ensure that they appear to be in good health and are free from suspected disease. Each outplant fragment or colony must meet the following criterion prior to outplanting:

- 1) Mountainous star coral (*Montastrea faveolata*), great star coral (*M. cavernosa*), and symmetrical brain coral (*Diploria strigosa*) fragments must have at least 2.5 cm (approx. 1”) of linear growth.
- 2) Show no visible signs of disease, injury, or active predation based on the presence of:
 - a. Bleaching and/or paling of tissue or other discoloration.
 - b. Recent mortality (denuded skeleton to development of fine “fuzz” on mounds, grooves, or projections indicating mortality within a couple of weeks prior to observation).
 - c. Bearded fireworm, *Hermodice carunculata* or the gastropod *Coralliophila abbreviata* in feeding positions (at tissue loss margin).
 - d. Microbial mat (e.g., black band cyanobacteria and other organisms at tissue loss margin).
 - e. Growth anomalies (altered morphology of tissue and skeleton).

Data Collection

The following data must be recorded prior to outplanting for each nursery genotype represented, and must be reported to the FWC upon expiration of the license:

- 1) Name of original collector.
- 2) Species name.
- 3) Date of collection.
- 4) Original donor colony location information (GPS coordinates, water depth).
- 5) Original donor colony ID number, including “D” for donor colony.
- 6) Number of days in the nursery.
- 7) Location of nursery (GPS coordinates, water depth)

The following data must be recorded prior to outplanting for each outplant fragment or colony, and must be reported to the FWC upon expiration of the license:

- 1) Documented verification that suspected disease(s) and active predation was assessed and NOT observed for the outplant fragment or colony, based on the Visual Health Assessment criterion above.
- 2) Fragment or colony ID number.
- 3) Fragment or colony genotype
- 4) Fragment or colony size, in one of the following size classes, defined by total linear extension – 1 – 4 cm, 5- 10 cm, 11 – 50 cm, 51 – 100 cm, 101 – 200 cm, anything larger than 201 cm will be estimated to the nearest 100 cm.
- 5) Photographic documentation of fragment immediately after release (at depth).

Release Protocol for Captive-reared Mountainous Star, Great Star, and Brain Corals

- 6) It is recommended that a comment section be provided on the data collection sheet in the event that the collector wishes to provide any additional information they may deem to be relevant (i.e. water visibility, etc.) at the time of release.

Monitoring Requirements

- 1) Data Collection. The following data must be collected for a representative subset of fragments (defined by 5 outplant fragments or colonies per genotype at each outplant site) at one month and three months after release and must be reported to the FWC upon expiration of the license:
 - a. Name of monitoring personnel.
 - b. Species name.
 - c. Date of monitoring event.
 - d. Site name (GPS coordinates).
 - e. Fragment ID number.
 - f. Documented verification that suspected disease(s) and active predation was assessed for the fragment, based on the Visual Health Assessment criterion above.
- 2) Diseased fragments. At each monitoring event, the representative subset of outplant fragments or colonies (see above) will be assessed for disease. If one of these fragments or colonies is identified to be diseased, all of the fragments or colonies at that site will be assessed for disease. If a fragment or colony is identified to be diseased, a photograph must be taken and the diseased portion of the fragment or colony must be sealed with epoxy or removed from the site. A representative set of disease samples shall be preserved for health screening according to the Fixation/Handling of Coral Samples protocol below.

Fixation/Handling of Coral Samples

As soon as possible fix the sample(s) using the following fixative ratios:

Ideally a 20:1 (fixative to tissue volume) will be used. At a minimum a 10:1 (fixative to tissue volume) can be used.

- Standard fixative is 5% PFMA (Paraformaldehyde) in 0.1M Phosphate Buffer, pH 7.4.
- 10% formalin (prepared from 37% Formaldehyde) in 0.1M Phosphate Buffer, pH 7.4 may also be used.
- 10% Neutral Buffered Formalin purchased from outside vendors is acceptable.
- 10% seawater formalin (prepared from 37% formaldehyde)

Fix tissue samples on ice or in the refrigerator, as lower temperatures delay autolysis during penetration of the fixative.

Use a sample jar (preferably plastic for ease of transport and handling) large enough to accommodate the volume of fixative required for the size of the sample. Retain sample until arrangements can be made to ship to a diagnostic laboratory for health screening (TBD).

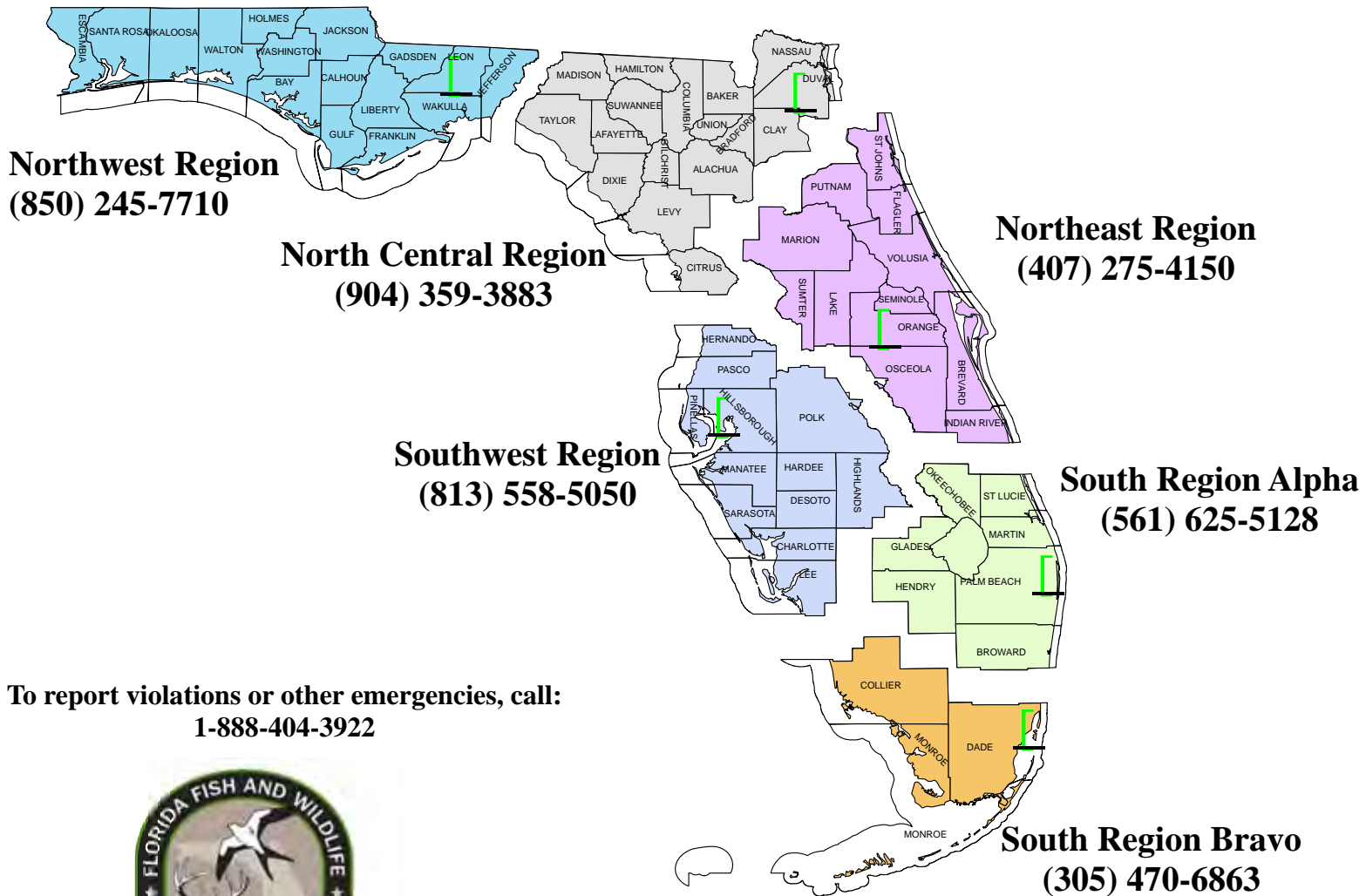
If immediate fixation is not possible, pack the samples thoroughly and completely **IN ICE (not touching – preferably in plastic bags)** to minimize postmortem changes.

FWC will provide materials for fixation of diseased coral samples if needed.

Notification Requirement

Notification must be made to the FWC in accordance with the license requirements if any disease is suspected within the first three months after release. This notification should be in the form of an email to Kerry Maxwell (Kerry.Maxwell@MyFWC.com) with a subject that reads “Mote Outplant Disease Observation”. Kerry Maxwell will arrange transfer of the diseased coral samples to the FWC.

FWC Division of Law Enforcement Regional Communication Center Contact Information



The numbers listed are manned 24 hours daily.
If SAL holders need to provide information via fax, please request the fax number from dispatcher.



0 50 100 200 Miles

The holder of a SAL must notify the nearest Commission Law Enforcement Dispatch Center not later than 24 hours prior to conducting activities under a SAL. Notification may consist of a float plan detailing locations, dates, and times of activities. Deviations from the float plan are permitted only after 24-hour advance notification to the nearest Commission Law Enforcement Dispatch Center. Float plans are valid for the duration of the SAL unless rescinded by the SAL holder.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
(727) 824-5312; FAX (727) 824-5309
<http://sero.nmfs.noaa.gov>

JAN - 6 2012

F/SER31:JAM

Mr. Sean Morton
NOAA Ocean Service
Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040

Ms. Elsa Alvear
National Park Service
Biscayne National Park
9700 SW 328th Street
Homestead, FL 33033

Ms. Tracy Ziegler
National Park Service
Dry Tortugas National Park
P.O. Box 6208
Key West, FL 33041

Dear Mr. Morton, Ms. Alvear, and Ms. Ziegler:

This constitutes NMFS' biological opinion in response to your request dated October 21, 2011, for initiation of consultation under section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). Your request was made on behalf of the Florida Keys National Marine Sanctuary ("Sanctuary"), Biscayne National Park, and Dry Tortugas National Park. Therefore, this opinion fulfills the section 7 responsibilities of both the Sanctuary and the two National Parks ("Parks") and covers the actions of both agencies.

Description and Effects of the Proposed Action

The Sanctuary is reviewing two permit applications. The first is from Caitlin Lustic of The Nature Conservancy (TNC) for the project, "Threatened Coral Recovery in Florida and the U.S. Virgin Islands," which has received American Recovery and Reinvestment Act (ARRA) funding from the NOAA Restoration Center. The purpose of the project is to introduce wild-collected, nursery-reared *Acropora* fragments to depleted areas to establish multi-clonal populations ("outplanting"). These populations will facilitate sexual reproduction of *Acropora* species. The second permit application is from Ken Nedimyer of the Coral Restoration Foundation (CRF) for the project, "Multi-Species Coral Nursery and Reef Restoration Program for the FKNMS." As discussed below, this opinion is only applicable to the TNC activities proposed to be permitted and a separate consultation is being conducted for the effects of the second proposed permit.

The Parks are reviewing two permit applications. The first is from TNC for the portions of the aforementioned project being conducted in the Dry Tortugas National Park. The second is from Dr. Diego Lirman of the University of Miami for the portions of the TNC project being conducted in Biscayne National Park.



The proposed action consists of scientific research, enhancement, and restoration activities directed at elkhorn and staghorn corals funded by NOAA RC in Florida, Puerto Rico, and the USVI and authorized by the Sanctuary and Parks in Florida. The effects of NOAA RC's funding of these activities was previously evaluated in the Programmatic Biological Opinion on Coral Reef Research, Enhancement, and Restoration Activities Covered by the 4(d) Rule for Elkhorn and Staghorn Corals (50 CFR 223.208) issued on September 14, 2011, to the National Marine Fisheries Service (NMFS), Office of Habitat Conservation, Restoration Center (RC) (F/SER/2011/00710) (NOAA RC programmatic biop). In reviewing the information presented in your letter, we determined that the effects of the actions from the TNC project, "Threatened Coral Recovery in Florida and the U.S. Virgin Islands," are a subset of effects analyzed in the NOAA RC programmatic biop (attached for your reference). Since the TNC project is ARRA-funded by the RC and coral outplanting is one of the actions evaluated in the NOAA RC programmatic biop, we can evaluate the applicability of the conclusions of that consultation to the Sanctuary and Parks' proposed actions. The Sanctuary and Parks' actions of authorizing the TNC project, and the methods to be used by the TNC, meet the NOAA RC programmatic biop's Project Design Criteria and do not have any effects on listed *Acropora* outside of those evaluated in the RC's programmatic consultation. Therefore, the conclusions of the RC's programmatic consultation are applicable to the Sanctuary and Parks' actions of authorizing the TNC project. Hence, the relevant analyses and conclusions of the NOAA RC's programmatic biop are incorporated by reference into this consultation.

Conclusion

It is NMFS' biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of elkhorn or staghorn corals. Because the proposed action does not include any prohibited incidental take, no incidental take statement is provided; moreover, no reductions in numbers, reproduction, or distribution of either threatened coral species are expected to result from the action.

If the Sanctuary and Parks' actions are subsequently modified in a manner that causes an effect to listed *Acropora* or designated critical habitat that was not considered in the NOAA RC programmatic biop, the Sanctuary will need to re-initiate consultation.

We look forward to further cooperation with you on other Sanctuary projects to ensure the conservation and recovery of our threatened and endangered marine species. If you have any questions regarding this consultation, please contact Jennifer Moore, natural resource specialist, at the number listed above, or by e-mail at jennifer.moore@noaa.gov.

Sincerely,



for Roy E. Crabtree, Ph.D.
Regional Administrator

Enclosure

cc: F/HC3 – Craig, Moore
F/PR3

Ref: F/SER/2011/05414



UNITED STATES DEPARTMENT OF COMMERCE
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F/SER31:NB

SEP 14 2011

MEMORANDUM FOR: F/HC3 – Leslie Craig

FROM: *for* F/SE – Roy E. Crabtree, Ph.D. *Roman E. Weaver*

SUBJECT: Programmatic Biological Opinion (Opinion) for NOAA
Restoration Center Coral Reef Activities

The attached document constitutes National Marine Fisheries Service's (NMFS) programmatic biological opinion (opinion) based on our review of the effects on elkhorn (*Acropora palmata*) and staghorn corals (*A. cervicornis*) that would result from NOAA Restoration Center's (RC) funding and implementing of coral reef scientific research and restoration activities. NMFS has analyzed these effects on listed species and designated critical habitat under our purview in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). It is NMFS' biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of elkhorn or staghorn corals or their designated critical habitat. Discretionary conservation recommendations are also included in the opinion.

This concludes formal consultation on the project outlined above, though please note that this programmatic consultation includes project-specific consultation procedures, described in the opinion. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) the amount or extent of taking specified in the incidental take statement is met or exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat (when designated) in a manner or to an extent not previously considered, (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the opinion, or (4) a new species is listed or critical habitat designated that may be affected by the identified action.

We look forward to further cooperation with you on other NOAA RC projects to ensure the conservation and recovery of our threatened and endangered marine species. If you have any questions regarding this consultation, please contact Nicole Bailey, Natural Resource Specialist, at the number listed above, or by e-mail at Nicole.bailey@noaa.gov.

Attachment

cc: F/PR3

Ref: P/SER/2011/00710



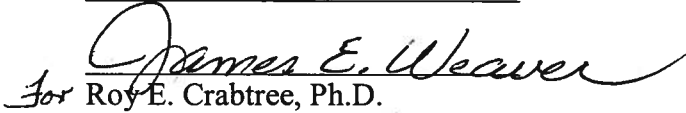
**Endangered Species Act - Section 7 Consultation
Biological Opinion**

Agency: National Oceanic and Atmospheric Administration
National Marine Fisheries Service (NMFS)
Habitat Conservation | Restoration Center

Activity: Programmatic Biological Opinion on Coral Reef Research,
Enhancement and Restoration Activities Covered by the 4(d) Rule
for Elkhorn and Staghorn Corals (50 CFR 223.208)
(P/SER/2011/00710)

Consulting Agency: National Marine Fisheries Service (NMFS)
Southeast Regional Office
Protected Resources Division

Date Issued: SEP 14 2011

Approved By: 
for Roy E. Crabtree, Ph.D.
Regional Administrator

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Background

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. §1531 *et seq.*), requires that each federal agency ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of those species. When the action of a federal agency may affect a protected species or its critical habitat, that agency is required to consult with either NMFS or the U.S. Fish and Wildlife Service (USFWS), depending upon the protected species that may be affected.

Consultations on most listed marine species and their designated critical habitat are conducted between the action agency and NMFS. Consultations are concluded after NMFS determines the action is not likely to adversely affect listed species or critical habitat or issues a biological opinion ("opinion") that determines whether a proposed action is likely to jeopardize the continued existence of a federally-listed species, or destroy or adversely modify federally-designated critical habitat. The opinion also states the amount or extent of listed species incidental take that may occur and develops non-discretionary measures that the action agency must take to reduce the effects of said anticipated/authorized take. The opinion may also recommend discretionary conservation measures. No incidental destruction or adverse modification of critical habitat may be authorized. The issuance of an opinion detailing NMFS' findings concludes ESA Section 7 consultation.

This constitutes NMFS' programmatic biological opinion (opinion) based on our review of the effects on elkhorn (*Acropora palmata*) and staghorn corals (*A. cervicornis*) that would result from NOAA Restoration Center's (RC) funding and implementing of coral reef scientific research and enhancement activities, and RC's implementation of restoration activities, that are covered by the 4(d) rule for these species at 50 CFR § 223.208. NMFS has analyzed these effects on listed species and designated critical habitat under our purview in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). It is NMFS' biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of elkhorn or staghorn corals or destroy or adversely modify their designated critical habitat.

Programmatic Consultations

NMFS and the USFWS have developed a range of techniques to streamline the procedures and time involved in consultations for broad agency programs or numerous similar activities with predictable effects on listed species and critical habitat. Some of the more common of these techniques and the requirements for ensuring that streamlined consultation procedures comply with Section 7 of the ESA and its implementing regulations are discussed in the October 2002 joint Services memorandum, *Alternative Approaches for Streamlining Section 7 Consultation on Hazardous Fuels Treatment Projects* (<http://www.fws.gov/endangered/pdfs/MemosLetters/streamlining.pdf>; see also, 68 FR 1628 (January 13, 2003)).

Programmatic consultations can be used to evaluate the expected effects of groups of related agency actions expected to be implemented in the future, where specifics of individual projects such as project location are not definitively known. A programmatic biological opinion must identify project design criteria (PDCs) or standards that will be applicable to all future projects implemented under the opinion. PDCs serve to prevent adverse effects to listed species, or to limit adverse effects to predictable levels that will not jeopardize the continued existence of listed species or destroy or adversely modify critical habitat, at the individual project level or in the aggregate from all projects implemented under the programmatic opinion. Programmatic consultations allow for streamlined project-specific consultations because much of the effects analysis is completed up front in the programmatic opinion. At the project-specific consultation stage, a proposed project is reviewed to determine if it can be implemented according to the PDCs, to evaluate the specific amount of any adverse effects including take expected from the specific project, and to evaluate or tally the aggregate effects or take that will have resulted by implementing projects under the programmatic opinion to date, including the proposed project. The following elements should be included in a programmatic consultation to ensure its consistency with ESA Section 7 and its implementing regulations.

1. Project design criteria to prevent or limit future adverse effects on listed species and critical habitat;
2. Description of the manner in which projects to be implemented under the programmatic consultation may adversely affect listed species and critical habitat and evaluation of expected level of adverse effects from covered projects;
3. Process for evaluating expected, and tracking actual aggregate or net additive effects of all projects expected to be implemented under the programmatic consultation. The programmatic consultation document must demonstrate that when the PDCs are applied to each project, the aggregate effect of all projects will not jeopardize listed species or destroy or adversely modify critical habitat;
4. Procedures for streamlined project-specific consultation. As discussed above, if an approved programmatic opinion is sufficiently detailed, project-specific consultations ideally will consist of certifications and concurrences between action agency biologists and consulting agency biologists, respectively. An action agency biologist or team will provide a description of a proposed project and a certification that it will be implemented in accordance with the PDCs. The action agency also provides a description of anticipated project-specific effects and a tallying of net effects to date resulting from projects implemented under the program, and certification that these effects are consistent with those anticipated in the programmatic opinion. The consulting agency biologist reviews the submission and provides concurrence, or adjustments to the project necessary to bring it into compliance with the programmatic opinion. The project-specific consultation process must also identify any effects that were not considered in the programmatic consultation. Finally, the project-specific consultation procedures must provide contingencies for proposed projects that cannot be implemented in accordance with the PDCs; full stand-alone consultations may be performed on these projects if they are too dissimilar in nature or in expected effects from those projected in the programmatic consultation document.

5. Procedures for monitoring projects and validating effects predictions; and
6. Comprehensive review of the program, generally conducted annually.

Where a programmatic consultation anticipates take will result from individual projects, the programmatic opinion must evaluate whether the total maximum take that could result from the program, given implementation of the PDCs, will jeopardize listed species. However, take is not authorized until project-specific consultations are completed, and the project-specific take is determined and certified to be consistent with the projections of the programmatic consultation. The programmatic opinion may identify reasonable and prudent measures (RPMs) to reduce the impact of take resulting from future projects, and additional RPMs may be identified during project-specific consultations.

The on-going consultation process described in this opinion for the funding and implementing of scientific research, enhancement, and restoration activities directed at *Acropora* spp. by NOAA RC includes elements that ensure consistency with the requirements of ESA Section 7, as described above. As discussed below, the take of elkhorn and staghorn corals may result from certain coral reef research, enhancement, or restoration activities conducted or funded by NOAA RC; however, this take does not constitute prohibited take. The types of restoration activities conducted by NOAA RC that are covered by this consultation are excepted from the take prohibition under the 4(d) regulations for the conservation of listed corals (an excepted restoration activity is defined as the methods and processes used to provide aid to injured individual elkhorn or staghorn coral). Similarly, the scientific research and enhancement activities conducted by NOAA RC that are covered by this consultation require one of the permits included in the 4(d) regulations for listed corals. Similarly, NOAA RC will not release funding for research or enhancement activities unless one of the permits included in the 4(d) regulations for listed corals is issued to the grantee or applicant within the applicable jurisdiction. Given that (1) the intent of this programmatic opinion is to cover only coral take that is excepted under the 4(d) regulations for the conservation of listed corals; and (2) the research and enhancement activities discussed within this programmatic opinion are required to have one of the permits included in the 4(d) regulations for the conservation of listed corals in order to be carried out or funded, the take resulting from the activities covered by this consultation does not constitute prohibited take. Therefore, no project-specific incidental take statements and RPMs will be issued; however, project-specific take is not authorized until completion of a project-specific consultation, as described in this opinion.

BIOLOGICAL OPINION

1.0 Consultation History

On March 3, 2011, we received a request for programmatic consultation under Section 7 of the Endangered Species Act (ESA) from NOAA Restoration Center (RC) for scientific research and restoration activities funded and implemented by NOAA RC in Florida, Puerto Rico, and the U.S. Virgin Islands (U.S.V.I.) that may result in take of listed *Acropora* species. NOAA RC determined that some of their funded or implemented activities may affect, but are not likely to adversely affect, both *Acropora palmata* (elkhorn) and *A. cervicornis* (staghorn) coral species and their designated critical habitat. Previously, NOAA RC consulted with NMFS on the proposed issuance of individual permits for research and restoration activities conducted on elkhorn and staghorn corals. Additional information concerning critical habitat effects, project design criteria, and proposed project methods was requested by NMFS via e-mail on May 3, 2011. We received a response from NOAA RC via e-mail on May 4, 2011. We initiated consultation on May 4, 2011.

2.0 Description of the Proposed Action

2.1 Expected Types of Projects and Types of Impacts to Listed Corals

In the Southeast Region, NOAA RC addresses natural resource impacts caused by natural events and vessel groundings. NOAA RC is involved in both funding and implementing scientific research, enhancement, and restoration activities directed at elkhorn and staghorn corals in Florida, Puerto Rico, and the U.S.V.I. through its Community Restoration Program (CRP). NOAA RC establishes partnerships with local organizations, state and territorial governmental agencies, and other federal agencies to leverage funding and build capacity to restore and manage coral reef ecosystems. Additionally, the NOAA RC Damage Assessment, Remediation, and Restoration Program (DARRP) provides technical support and funding for emergency response and restoration activities on coral reef ecosystems affected by vessel groundings where there is a threat of an oil spill. Vessel grounding response actions typically include identifying sensitive resources (e.g., coral reefs, seagrass beds), providing technical advice to salvage operators (e.g., best management practices for minimizing further resource damage), negotiating with responsible parties, providing damage assessments, and providing emergency restoration of damaged resources (e.g., coral reef damage).

The purpose of NOAA RC's CRP and DARRP is to conserve coral reef ecosystems and minimize the amount of damage caused by vessel groundings and natural events. The priorities of NOAA RC activities, as they relate to listed corals directly, are: (1) active enhancement¹ of listed corals through the expansion of in-water nursery efforts; (2) implementation of restoration activities to increase herbivory on coral reefs; (3) development and maintenance of the capacity to respond to physical impacts (e.g., vessel groundings, anchor damage, storm damage); (4) removal or stabilization of rubble or debris that affects healthy listed corals; and (5) funding and

¹ To enhance the propagation or survival of the affected species (ESA Section 10(a)(1)(A))

implementation of restoration activities in local watershed management plans associated with priority coral reefs (e.g., those containing listed corals). NOAA RC's CRP and DARRP activities, as they relate to coral reef ecosystems and listed coral species, typically involve the following activities:

1. Tissue sampling, which involves the collection of one polyp (~ 1 cm² of tissue) or larger sections (~ 2-10 cm branch tip) using hand tools such as a syringe, shears, or pliers. The smaller samples (~ 1 cm² of tissue) typically are used for genotyping coral colonies, and the larger samples (~ 2-10 cm branch tip) typically are used for propagating coral colonies.
2. Collection of naturally-available coral fragments (e.g., picking up loose fragments from the sea floor by hand). Naturally-available fragments taken with hand tools (see above) are often subsequently reattached during restoration, managed in a nursery, or transplanted to a nearby reef.
3. Placement, reattachment, or stabilization of fragments, coral colonies, or nursery-reared corals using epoxy, cement, or mechanical devices (e.g., plastic cable ties). Corals may be reattached either to the sea floor or to a base (e.g., a concrete disk or limestone), which is then affixed to the sea floor.
4. Removal of corallivorous grazers from coral colonies by hand.
5. Stabilization and restoration of physical impacts to natural consolidated hard substrate or dead coral skeleton damaged resulting from vessel groundings, anchor damage, and storms. Physical impacts may consist of fragmentation of substrate, dislodging or overturning of large pieces of substrate, or pulverization. Stabilization techniques include the use of cement, rebar, concrete nails, and sometimes, limestone.
6. Marking of coral colonies using plastic tags, nails, flagging tape, or other identifying markers to areas of bare substrate immediately adjacent to the coral colony. Rarely are these markers placed directly on the coral colony. Various monitoring activities (e.g., growth, disease, spawning potential) require marking coral colonies.
7. Measuring coral colonies using hand-placed calipers or flexible tapes, which briefly (< 5 minutes) remain in contact with the coral colony. This activity is employed during various monitoring activities, including monitoring of coral colonies to measure growth or spread of disease.

The type of method used is dependent on the goals and objectives of the research, enhancement, or restoration activity. In-water research, enhancement, and restoration activities are typically performed by small teams of divers using SCUBA. For nursery sites, the following items are monitored:

- Mortality, bleaching, and disease.
- Coral size.
- Coral growth.
- Outplant survival.

- Outplant growth.

Following restoration activities, a subset of sites and coral colonies are monitored to assess coral survival, disease, bleaching, and algal growth. Photo documentation is conducted for all corals that are included in the monitoring program.

Based on previous experience, NOAA RC anticipates responding to between 5 and 7 vessel groundings (or other physical impact events) involving *Acropora* spp. per year and would necessitate implementing 4(d)-excepted restoration actions, and between 8 and 10 vessel groundings (or other physical impact events) involving designated critical habitat for elkhorn and staghorn corals each year. NOAA RC conducts one or more of the activities listed above to respond to vessel groundings or other physical impact events. Based on past project experience, NOAA RC anticipates the set-up of two or more coral nurseries per year, and funding of two or more coral nursery projects each year. The set-up and maintenance of coral nurseries involves one or more of the activities listed above.

2.2 *Authorities Under Which the Proposed Action Will be Conducted*

As the primary federal natural resource trustee for coastal resources, NOAA has responsibility for restoration of coastal resources injured by releases or threatened releases of hazardous materials or oil and of national marine sanctuary resources injured by physical impacts. The Clean Water Act (CWA; 33 U.S.C. 1251 *et seq.* §311), Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or Superfund; 42 U.S.C. 9601 *et seq.* §104, 106, 107, and 122), and Oil Pollution Act (OPA; 33 U.S.C. 2701 *et seq.* §1002 and §1006) mandate that parties that release hazardous materials and oil into the environment are responsible not only for the cost of cleaning up the release, but also for restoring any injury to natural resources that results from the release or from response actions directed at such releases. Additionally, NOAA RC funds habitat restoration projects under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661, as amended) and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. NOAA RC fulfills these legislative mandates through implementation of its CRP and DARRP. While emergency restoration activities are led by NOAA RC, these activities are supported with funding from DARRP, NMFS Southeast Regional Office, and NOAA's Coral Reef Conservation Program. Through the promulgation of the 4(d) regulations for threatened elkhorn and staghorn corals (73 FR 64264; October 28, 2008) the emergency restoration activities led by NOAA RC under the authority of the CWA, CERCLA, and OPA are excepted from the ESA Section 9 prohibitions when the restoration activity is implemented for either of the two acroporid corals. The 4(d) regulations define an excepted restoration activity as "the methods and processes used to provide aid to injured individual elkhorn or staghorn corals" (50 CFR § 223.208)².

Grants, Cooperative Agreements, Memoranda of Understanding (MOUs), Memoranda of Agreement (MOAs), and contracts include specifications on the allowable activities and

² As discussed in the final 4(d) rule (73 FR 64264; October 28, 2008), the restoration exception applies to the range of activities that have the objective of rescuing injured elkhorn and staghorn specimens and restoring them in their reef habitats. To the extent that existing restoration authorities allow for activities to be conducted at some time after the discovery of the injury, the restoration exception applies.

location(s) that will be funded by NOAA RC. The proposed scientific research and enhancement projects directed at listed coral species and implemented or funded by NOAA RC must have one of the permits included in the 4(d) regulations for the conservation of listed corals in order to be implemented or funded and covered by this consultation. The permitting agencies included in these regulations are the National Ocean Service (National Marine Sanctuary Program), National Park Service, FWS, Florida Fish and Wildlife Conservation Commission, Puerto Rico Department of Natural and Environmental Resources (DNER), and the U.S.V.I. Department of Planning and Natural Resources (DPNR). These agencies and their permitting programs for scientific research and enhancement activities directed at threatened elkhorn and staghorn corals are excepted from the ESA Section 9 prohibitions extended to these species (50 CFR § 223.208). NMFS determined that if research directed at elkhorn and staghorn coral is in compliance with one of the permit programs listed above, any exportation or take that occurs under such a permit would not constitute a violation of the ESA Section 9 prohibitions.

When appropriate, NOAA RC staff will complete consultations with other state and federal agencies based on the proposed activities. These consultations may include, but are not limited to: Federal consistency determination under the Coastal Zone Management Act, essential fish habitat review with NMFS Habitat Conservation Division, review by the Protected Resources Division (PRD) for potential marine mammal effects under the Marine Mammal Protection Act, consultation with PRD related to possible endangered species effects under Section 7 of the ESA 9 (e.g., potential effects to listed species of sea turtles), and discussion with state and federal historic preservation officers under the National Historic Preservation Act (e.g., potential impacts to cultural resources such as submerged shipwrecks). Each project also is reviewed for compliance with the National Environmental Policy Act (NEPA), as funding of projects by NOAA RC is a federal action subject to NEPA. NOAA RC typically completes NEPA review through a project-specific Environmental Assessment, Categorical Exclusions, or through the NOAA RC Programmatic Environmental Assessment for Common Restoration Activities. To date, NOAA RC has not had to prepare an Environmental Impact Statement for any coral reef restoration project.

2.3 *Project Design Criteria (PDCs)*

Based upon past activities conducted and/or funded by NOAA RC and consultations on proposed scientific research, enhancement, and restoration activities directed at elkhorn and staghorn corals, PDCs have been identified that have typically been applied to these activities and that limit adverse effects to those that are temporary and never result in mortality of wild coral colonies. The nature of research, enhancement, and restoration involved will dictate which of the PDCs will be applicable to future projects covered by this programmatic consultation; some of the PDCs will be irrelevant to certain types of research, enhancement, or restoration activities.

- The individual scientific research or enhancement project directed at listed coral species and implemented or funded by NOAA RC will be permitted by one or more of the federal, state, and territorial natural resource management agencies included the exceptions to the ESA Section 9 prohibitions extended to these species (50 CFR §223.208(c)(1)). These agencies include National Ocean Service (National Marine Sanctuary Program), National Park Service, U.S. Fish & Wildlife Service (FWS), Florida

Fish and Wildlife Conservation Commission, Puerto Rico Department of Natural and Environmental Resources (DNER), and the U.S.V.I. Department of Planning and Natural Resources (DPNR).

- The individual emergency restoration activities directed at listed coral species or their designated critical habitat will be conducted by NOAA RC under the authority of one or more of the statutes included in the exceptions to the ESA Section 9 prohibitions extended to these species (50 CFR § 223.208(c)(2), Table 1). These statutes include CERCLA and OPA.
- Removal of *Acropora* spp. samples from the field will target fragments that have been produced naturally, whenever possible, prior to sampling intact colonies.
- Tissue collections will be taken from the outermost portion of *Acropora* spp. branches or branch tips, or from the growing edge of the base of *A. palmata* if branches are not present. Tissue collections will be made using hand tools (e.g., syringes, bone cutters, pliers, or similar), will be minimal in size (< 10 cm length or 25 cm^2), and will be dispersed among colonies.
- Tissue collections, if required, will be minimized in quantity and sample dimension, and dispersed geographically.
- Collection or research-induced mortality of whole colonies will not be authorized.
- Identification markers (with the exception of those placed on *Acropora* spp. branches to measure linear extension) and other research equipment will be anchored to substrate adjacent to *Acropora* spp. and not anchored to corals themselves. Removal of research equipment prior to storm events will be required.
- Stabilization and restoration activities conducted in response to physical impacts shall be conducted using field-tested methods and in a manner that results in only temporary and beneficial impacts to the essential feature for coral critical habitat.
- The following project design criteria apply specifically to proposed projects involving the outplanting of nursery-reared colonies of elkhorn and staghorn corals onto the reef environment:
 - o Outplanted colonies will have at least 5 cm of linear growth (elkhorn coral) or be at least 5 cm in diameter (staghorn coral). Additionally, outplanted colonies of either species will show no visible signs of disease or injury, have 100 percent live tissue, and show robust coloration, suggesting good health.
 - o Colonies of elkhorn and staghorn corals to be outplanted from nurseries onto the reef will be placed, reattached, or stabilized using field-tested methods.
 - o Site selection for outplanting colonies of elkhorn and staghorn corals from nurseries onto the reef will be guided by the presence of suitable reef habitat

and/or historic presence of the species (in recent decades) and the relative health of the surrounding reef environment. Site selection will be diverse to minimize risk, and outplanting sites will not be within any permitted marine and coastal construction areas (i.e. dredging, beach nourishment projects, etc.).

- When outplanting, dominance of one genotype at any one particular site will be limited, and the diversity of genotypes available in nursery-reared coral colonies will be maximized

2.4 *Project-Specific Review and Consultation Process for the Proposed Action*

Scientific research, enhancement, or restoration activities directed at elkhorn or staghorn coral proposed for implementation by NOAA RC or proposed to receive funding from NOAA RC are reviewed on the following criteria, and NOAA RC will reject a proposal unless all of these criteria are satisfactorily met. These criteria are meant to ensure the protection of NOAA trust resources and include:

- (i) The staff, contractor, and/or funding recipient is professionally qualified to conduct and complete the proposed scientific research, enhancement, or restoration activities and has experience working with corals and *Acropora* spp.
- (ii) The staff, contractor, and/or funding recipient, upon approval of funding, have adequate resources available to conduct and complete the proposed scientific research, enhancement, or restoration activities.
- (iii) The duration of the proposed scientific research, enhancement, or restoration activities is no longer than necessary to achieve the stated purpose(s).
- (iv) The methods and procedures proposed by the staff, contractor, and/or funding recipient are appropriate to achieve the goals of the proposed scientific research, enhancement, or restoration activities relative to the anticipated impacts to the quality of NOAA trust resources, including *Acropora* spp.
- (v) The proposed scientific research, enhancement, or restoration activities are conducted in accordance with the purposes of the 4(d) regulations for the conservation of listed corals and with the primary objective of protecting NOAA trust resources and qualities.
- (vi) It is necessary to conduct the proposed scientific research, enhancement, or restoration activities in the proposed area to achieve the stated purpose(s).
- (vii) The proposed scientific research, enhancement, or restoration activities are compliant with the project design criteria (PDCs) contained within this programmatic opinion.
- (viii) The proposed scientific research, enhancement, or restoration activities are in compliance with the 4(d) regulations for the conservation of elkhorn and staghorn corals.
- (ix) The proposed scientific research, enhancement, or restoration activities are intended to benefit the essential feature for listed corals' designated critical habitat, where applicable.
- (x) The applicant conducting the scientific research, enhancement, or restoration activities has attained the required permit(s) prior to receiving funding from NOAA RC.

While some projects are directly implemented by NOAA RC, many projects are implemented by partners receiving NOAA RC funding and/or technical support. Partners requesting funding from NOAA RC are not eligible for funding unless the proposed project meets the ten criteria

listed above as well as the PDCs. Once a proposed project is selected for funding, funding is not provided until the proposed project receives a permit from one of the above-listed state, territorial, or federal permitting programs. NOAA RC shall require monitoring and reporting requirements on the funding agreements to achieve additional resource protection. At a minimum, these requirements include specification of some or all of following parameters:

- Location of nursery, donor, and outplanting sites.
- Number and size of colonies collected.
- Number of fragments generated.
- Number of corals in a nursery site.
- Current nursery capacity and expected maximum capacity.
- Mortality, bleaching, and disease.
- Size and growth of corals.
- Outplanted coral survival and growth.

Proposals for individual scientific research, enhancement, and restoration activities that meet all of the above criteria and that meet the PDCs above will be forwarded from NOAA RC to NMFS' Southeast Region Protected Resource Division (PRD) Section 7 Coordinator or his/her designee for review. At this stage, NOAA RC will seek NMFS PRD's concurrence with its determination that the proposed action is within the scope of this programmatic biological opinion, based on the description of the individual proposed activity, is compliant with applicable PDCs, the predicted project-specific effects (by species), and the net aggregate effects of projects implemented under this opinion as of the date of a specific proposed research permit (by species).

Scientific research, enhancement or restoration activities conducted on elkhorn or staghorn corals by NOAA RC or with NOAA RC funding that cannot be implemented in accordance with the PDCs above *or* which are expected to result in effects to listed corals outside the scope of those discussed in Section 5.0 (e.g., are not temporary effects, or involve mortality of coral colonies), will not be covered by this programmatic opinion and will require stand-alone consultation. Similarly, scientific research or restoration activities conducted within designated critical habitat for listed corals by NOAA RC or with NOAA RC funding that cannot be implemented in accordance with the PDCs above or which are expected to result in effects to designated critical habitat outside the scope of those discussed in Section 4.1 (e.g., are not temporary effects, or result in impacts that are solely beneficial) will not be covered by this programmatic opinion and will require stand-alone consultation.

2.5 *Annual Comprehensive Review of Operation of Programmatic Consultation*

PRD and NOAA RC will conduct a review of the operation of the programmatic consultation annually. This review will evaluate, among other things, whether the nature and scale of programmatic effects predicted continues to be valid; whether the PDCs continue to be appropriate; and whether the project-specific consultation procedures are being complied with and are effective. To assist in this annual review, NOAA RC must submit an annual report to NMFS detailing the numbers, locations, and types of activities directed at *Acropora* spp. that were implemented and funded, including nursery, donor, and outplanting site locations; number and size of colonies collected, fragments generated, or corals in a nursery site; current nursery

capacity and expected maximum capacity; mortality, bleaching, and disease data; size and growth of corals; and outplanted coral survival and growth.

3.0 Action Area

The action area is defined by regulation as “all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action” (50 CFR 402.02). The proposed action area is the Florida Reef Tract, and the reefs surrounding Puerto Rico and the U.S.V.I. Individual permitted activities are usually focused on small sites, but these may be located throughout these areas where elkhorn and staghorn corals exist.

4.0 Status of Listed Species and Critical Habitat

Much of the information for this section, as well as additional detailed information relating to the species’ biology, habitat requirements, threats, and recovery objectives, can be found in the status review and recovery plan for each species (see www.nmfs.noaa.gov/prot_res/PR3/recovery.html). Table 1 lists the endangered (E) and threatened (T) sea turtle and fish species under the jurisdiction of NMFS, which occur in or near the action area. Table 2 lists the designated critical habitat areas that occur in or near the action area.

4.1 Species and Designated Critical Habitat in the Action Area

Table 1. Listed species in Florida, Puerto Rico, and U.S.V.I. likely to occur in or near the project area.

Common Name	Scientific Name	Status
Turtles		
green sea turtle	<i>Chelonia mydas</i>	E/T
hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E
leatherback sea turtle	<i>Dermochelys coriacea</i>	E
loggerhead sea turtle	<i>Caretta caretta</i>	T
Fish		
smalltooth sawfish	<i>Pristis pectinata</i>	E
Invertebrates		
elkhorn coral	<i>Acropora palmata</i>	T
staghorn coral	<i>Acropora cervicornis</i>	T

There are five species of sea turtles (green, hawksbill, Kemp's ridley, leatherback, and loggerhead) and the smalltooth sawfish that can possibly be found in or near the action area. Although these species may be present in the action area, there are no potential routes of effects to these species from the proposed action.

Table 2. Designated Critical Habitat Areas in or near the Proposed Action Area.

Turtles
green sea turtle (<i>Culebra Island and outlying keys, Puerto Rico</i>)
hawksbill sea turtle (<i>Mona and Mona Islands, Puerto Rico</i>)
leatherback sea turtle (<i>Sandy Point, St. Croix, U.S.V.I.</i>)
Elkhorn and Staghorn Corals
Florida Area
Puerto Rico Area
St. Thomas/St. John Area
St. Croix Area

The action area includes designated critical habitat for three species of sea turtles and for elkhorn and staghorn corals; however, the proposed action is not likely to adversely affect these habitats. There are no routes of effects to designated critical habitat for sea turtles. For ESA-designated coral critical habitat, many of the proposed scientific research activities (e.g., coral nurseries) will occur primarily in areas with sandy substrate. For proposed restoration activities (e.g., stabilization and restoration of physical impacts to natural consolidated hard substrate or dead coral skeleton), the anticipated effects to designated coral critical habitat are temporary and solely beneficial (see PDCs, above). The final critical habitat designation for listed corals (73 FR 72210; November 26, 2008) identified the key conservation objective for listed corals as facilitating increased incidence of successful sexual and asexual reproduction. The purpose of the proposed restoration activities is to maintain the integrity and availability of the essential feature through stabilization and restoration. The essential feature, which may have been destroyed because of physical impacts from vessel groundings, anchor damage, or storms, will be conserved. Thus, the proposed action will maintain the conservation function for designated critical habitat for listed corals and will not result in any adverse effects.

For the reasons given above, NMFS has determined five species of sea turtles (green, hawksbill, Kemp's ridley, leatherback, and loggerhead) and the smalltooth sawfish will not be affected by the proposed action. Designated critical habitat for sea turtles and elkhorn and staghorn corals also is not likely to be adversely affected. Therefore, these species and designated critical habitats will not be considered further in this opinion.

4.2 Species Likely to be Adversely Affected: Elkhorn and Staghorn Corals

Elkhorn and staghorn corals were listed as threatened under the ESA on May 9, 2006 (71 FR 266852), based on a status review initiated in 2004. Elkhorn and staghorn corals are the only

two corals listed under the ESA. The Atlantic *Acropora* Status Review (Atlantic *Acropora* Biological Review Team (BRT) 2005) presents a summary of published literature and other currently available scientific information regarding the biology and status of both elkhorn and staghorn corals. The following discussion summarizes those findings relevant to our evaluation of the proposed action.

Elkhorn and staghorn corals are two of the major reef-building corals in the wider Caribbean. Elkhorn colonies are flattened to near-round, with frond-like branches that typically radiate outward from a central trunk that is firmly attached to the sea floor. Staghorn colonies are staghorn-antler-like, with cylindrical, straight or slightly curved branches. The branching morphology of these species provides important habitat for other reef organisms. Historically, both acroporid species formed dense thickets at shallow (<5 m) and intermediate (10 to 15 m) depths in many reef systems, including some locations in the Florida Keys, western Caribbean (e.g., Jamaica, Cayman Islands, Caribbean, Mexico, Belize), and eastern Caribbean. Early descriptions of Florida Keys reefs referred to reef zones, of which the elkhorn and staghorn zones were described for many shallow-water reefs, based on the high coverage and colony density, and in some cases near exclusiveness, of these species (Figure 1) (Jaap 1984, Dustan 1985, Dustan and Halas 1987). In terms of accretion rates and the formation of structurally complex reefs, the structural and ecological roles of Atlantic *Acropora* spp. in the wider Caribbean are unique and cannot be filled by other reef-building corals (Bruckner et al. 2002).

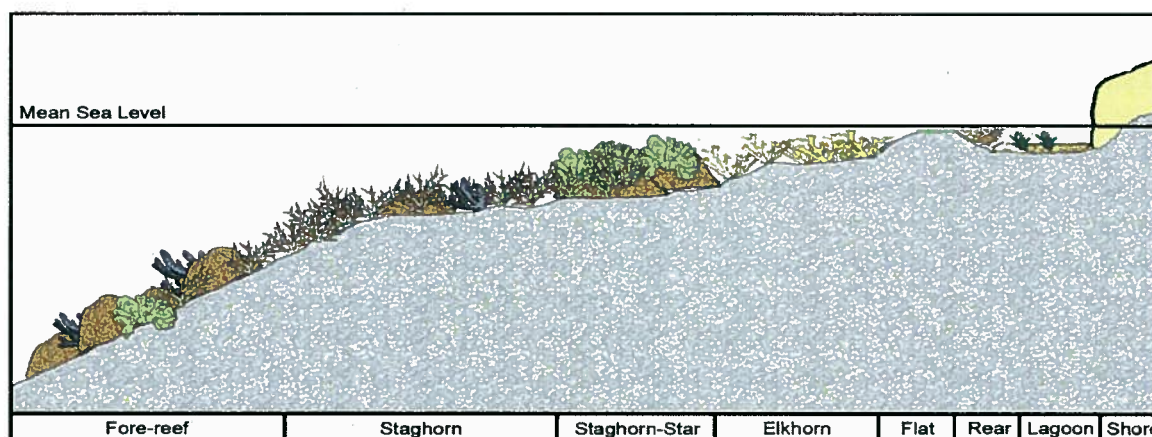


Figure 1: Reef zonation schematic example modified from several reef zonation-descriptive studies (Goreau 1959; Kinzie 1973; Bak 1977).

Life History

The maximum range in depth reported for elkhorn coral is <1 m to 30 m, but the optimal depth range for this coral is considered to be 1 to 5 m depth (Goreau and Wells 1967). Currently, the deepest known colonies of elkhorn coral occur at 21 m in the Flower Garden Banks National Marine Sanctuary (Hickerson pers. comm. to J. Moore, NMFS, June 2006) and at Navassa National Wildlife Refuge (Miller et al. 2008). The preferred habitat of elkhorn coral is the seaward face of a reef (turbulent shallow water), including the reef crest, and shallow spur-and-groove zone (Shinn 1963, Cairns 1982, Rogers et al. 1982). At low tide, colonies are sometimes exposed. Colonies of elkhorn coral often grow in nearly mono-specific, dense stands and form interlocking frameworks known as thickets in fringing and barrier reefs (Jaap 1984, Tomascik and Sander 1987, Wheaton and Jaap 1988). Storm-generated fragments are often found

occupying back reef areas immediately landward of the reef flat/reef crest, while colonies are rare on lagoonal patch reefs (Dunne 1979). Elkhorn coral has formed extensive barrier-reef structures in Belize (Cairns 1982), the greater and lesser Corn Islands, Nicaragua (Gladfelter 1982, Lighty et al. 1982), and Roatan, Honduras, and built extensive fringing reef structures throughout much of the Caribbean (Adey 1978). Colonies generally do not form a thicket below 5 m depth, with maximum water depths of framework construction ranging from 3 m to 12 m (see Table 1 in Lighty et al. 1982).

Historically, staghorn coral was reported from depths ranging from <1 to 60 m (Goreau and Goreau 1973). It is suspected that 60 m is an extreme situation and that the coral is relatively rare below 20 m depth. The common depth range is currently observed at 5 to 15 m. In southeastern Florida, this species historically occurred on the outer reef platform (16 to 20 m) (Goldberg 1973), on spur-and-groove bank reefs and transitional reefs (Jaap 1984, Wheaton and Jaap 1988), and on octocoral-dominated hardbottom (Davis 1982). Colonies have been common in back- and patch-reef habitats (Gilmore and Hall 1976, Cairns 1982). Although staghorn coral colonies are sometimes found interspersed among colonies of elkhorn coral, they are generally in deeper water or seaward of the elkhorn zone and, hence, more protected from waves. Historically, staghorn coral was also the primary constructor of mid-depth (10 to 15 m) reef terraces in the western Caribbean, including Jamaica, the Cayman Islands, Belize, and some reefs along the eastern Yucatan peninsula (Adey 1978).

All Atlantic *Acropora* spp. are considered to be environmentally sensitive, requiring relatively clear, well-circulated water (Jaap et al. 1989). Atlantic *Acropora* spp. are almost entirely dependent upon sunlight for nourishment compared to massive, boulder-shaped species in the region (Porter 1976, Lewis 1977), with these latter types of corals more dependent on zooplankton. Therefore, *Acropora* spp. may not be able to compensate with an alternate food source, such as zooplankton and suspended particulate matter, like other corals. Subsequently, Atlantic *Acropora* spp. are much more susceptible to increases in water turbidity than some other coral species. Reductions in long-term water clarity can also reduce the coral photosynthetic to respiration ratio (P/R ratio).

Optimal water temperatures for elkhorn and staghorn corals range from 25° to 29°C, although colonies in the U.S.V.I. have been known to tolerate short-term temperatures around 30°C without obvious bleaching (loss of zooxanthellae). All *Acropora* spp. require near oceanic salinities (34 to 37 ppt). All Atlantic acroporids are susceptible to bleaching due to adverse environmental conditions (Ghiold and Smith 1990, Williams and Bunkley-Williams 1990). Jaap (1979) and Roberts et al. (1982) note an upper temperature tolerance of 35.8°C for both species. Additionally, major mortality of elkhorn and staghorn corals occurred in the Dry Tortugas, Florida, in 1977 due to a winter cold front that depressed surface water temperatures to 14° to 16°C. Some reduction in growth rates of staghorn coral was reported in Florida when temperatures dropped to less than 26°C (Shinn 1966).

Atlantic *Acropora* spp., like many stony coral species, employ both sexual and asexual reproductive propagation. Atlantic *Acropora* spp. reproduce sexually by broadcast spawning, meaning that coral larvae develop externally to the parental colonies (Szmant 1986), and both species are simultaneous hermaphrodites, meaning that a given colony will contain both female

and male reproductive parts during the spawning season. Gametes (eggs and sperm) are located in different layers of the same polyp (Soong 1991). The spawning season for elkhorn and staghorn corals is relatively short, with gametes released only a few nights during July, August, and/or September. In some populations, spawning is synchronous after the full moon during any of these three months. Annual egg production in elkhorn and staghorn populations studied in Puerto Rico was estimated to be 600 to 800 eggs per cm^2 of living coral tissue (Szmant 1986).

In *Acropora* spp., fertilization and development are exclusively external. Embryonic development culminates with the development of planktonic larvae called planulae. Little is known concerning the settlement patterns (Bak et al. 1977, Sammarco 1980, Rylaarsdam 1983). In general, upon proper stimulation, coral larvae, whether released from parental colonies or developed in the water column external to the parental colonies, settle and metamorphose on appropriate substrates, in this case preferably coralline algae. Initial calcification ensues with the forming of the basal plate. Buds that form on the initial corallite develop into daughter corallites.

Studies of elkhorn and staghorn corals on the Caribbean coast of Panama indicated that larger colonies of both species (as measured by surface area of the live colony) have higher fertility rates (Soong and Lang 1992). For elkhorn coral, the larger the colony, the higher the fecundity rate; over 80 percent of the colonies larger than 4000 cm^2 were fertile. The estimated size at puberty for elkhorn coral was 1600 cm^2 and the smallest reproductive colony observed was $16 \times 8 \text{ cm}^2$. Only colonies of staghorn coral with a branch length larger than 9 cm were fertile and over 80 percent of colonies with branches longer than 17 cm ($n=18$) were fertile. The estimated size at puberty for staghorn coral was 17 cm in branch length and the smallest reproductive colony observed was 9 cm in branch length (Soong and Lang 1992).

Spatial and temporal patterns of coral recruitment have been intensively studied on wider Caribbean reefs (Birkeland 1977, Bak and Engel 1979, Rogers et al. 1984, Baggett and Bright 1985, Chiappone and Sullivan 1996). Biological and physical factors that have been shown to affect spatial and temporal patterns of coral recruitment include substrate availability and community structure (Birkeland 1977), grazing pressure (Rogers et al. 1984, Sammarco 1985), fecundity, mode and timing of reproduction (Harriot 1985, Richmond and Hunter 1990), behavior of larvae (Lewis 1974, Goreau et al. 1981), hurricane disturbance (Hughes and Jackson 1985), physical oceanography (Baggett and Bright 1985, Fisk and Harriot 1990), the structure of established coral assemblages (Lewis 1974, Harriot 1985), and chemical cues (Morse et al. 1988). Studies of *Acropora* spp. from across the wider Caribbean confirm two overall patterns of sexual recruitment: (1) low juvenile densities relative to other coral species and (2) low juvenile densities relative to the commonness of adults (Porter 1987). This pattern suggests that the composition of the adult population is dependent upon variable recruitment.

The growth rate of elkhorn coral, expressed as the linear extension of branches, is reported to range from 4 to 11 cm annually (Vaughan 1915, Jaap 1974). The growth rate for staghorn coral has been reported to range from 3 to 11.5 cm/yr. These growth rates are relatively fast compared to other corals and historically enabled the species to construct significant reefs in several locations throughout the wider Caribbean (Adey 1978). Growth of elkhorn and staghorn corals is also expressed in expansion, occurring as a result of fragmenting and forming new centers of growth (Bak and Crieens 1982, Tunnicliffe 1981). A broken off branch may be carried by waves

and currents to a distant location or may land in close proximity to the original colony. If the location is favorable, branches grow into a new colony, expanding and occupying additional area. Fragmenting and expansion, coupled with a relatively fast growth rate, facilitates potential spatial competitive superiority for elkhorn and staghorn corals relative to other corals and other benthic organisms (Shinn 1976, Neigel and Advise 1983, Jaap et al. 1989).

Status and Distribution

Throughout much of the wider Caribbean, *A. palmata* coral historically comprised the elkhorn zone (Figure 1) at 1 to 8 m depth (reef flat, wave zone, reef crest) in diverse areas including Jamaica (Goreau 1959), Alacran Reef, Yucatan peninsula (Kornicker and Boyd 1962), Abaco Island, Bahamas (Storr 1964), the southwestern Gulf of Mexico, Bonaire (Scatterday 1974), and the Florida Keys (Jaap 1984, Dustan and Halas 1987). The predominance of elkhorn coral in shallow reef zones is related to the degree of wave energy; in areas with strong wave energy conditions only isolated colonies may occur, while thickets may develop at intermediate wave energy conditions (Geister 1977). Although considered a turbulent water species, elkhorn coral is sensitive to breakage by wave action, and is thus replaced by coralline algae in heavy surf zones throughout the province (Adey 1977).

Historically, throughout much of the wider Caribbean, staghorn coral so dominated the reef within the 7 to 15 m depth that the area became known as the staghorn zone (Figure 1). It was documented in several reef systems such as the north coast of Jamaica (Goreau 1959) and the leeward coast of Bonaire (Scatterday 1974). In many other reef systems in the wider Caribbean, most notably the western Caribbean areas of Jamaica, Cayman Islands, Belize, and eastern Yucatan (Adey 1977), staghorn coral was a major mid-depth (10 to 25 m) reef-builder. Principally due to wind conditions and rough seas, staghorn coral has not been known to build extensive reef structures in the Lesser Antilles and southwestern Caribbean.

Available information on the historical distribution and abundance patterns focus on percent coverage, density, and relative size of the corals during three periods: pre-1980, the 1980 – 1990 decades, and recent (since 2000). Few data are present before the 1980 baseline, likely due in part to researchers' tendencies to neglect careful measurement of abundance of species that are ubiquitous.

Both acroporid species underwent precipitous declines in the early 1980s throughout their ranges and this decline has continued. Although quantitative data on former distribution and abundance are scarce, in the few locations where quantitative data are available (e.g., Florida Keys, Dry Tortugas, Belize, Jamaica, and the U.S.V.I.), declines in abundance (coverage and colony numbers) are estimated at >97 percent. Although this downward (decline) trend has been documented as continuing in the late 1990s, and even in the past five years in some locations, local extirpations (i.e., at the island or country scale) have not been definitively documented.

Figure 2 summarizes the abundance trends of specific locations throughout the wider Caribbean where quantitative data exist illustrating the overall trends of decline of elkhorn and staghorn corals since the 1980s. It is important to note that the data are from the same geographic area, not repeated measures at an exact reef/site that would indicate more general trends. The overall regional trend depicted is a >97 percent loss of coverage (area of substrate the species occupy).

Threats and Outlook

Elkhorn and staghorn corals face myriad stressors that in some cases act synergistically. Diseases, temperature-induced bleaching, and physical damage from hurricanes are deemed to be the greatest threats to elkhorn and staghorn corals' survival and recovery. The impact of disease, though clearly severe, is poorly understood in terms of etiology and possible links to anthropogenic stressors. Impacts from anthropogenic physical damage (e.g., vessel groundings, anchors, divers/snorkelers), coastal development, competition, and predation are deemed to be moderate. Table 3 summarizes the factors affecting the status of elkhorn and staghorn corals and the identified sources of those stressors.

Many factors, including both intrinsic life history characteristics, as well as external threats, are important to consider in assessing the status and vulnerability of elkhorn and staghorn corals. Recovery of the two corals from their current level of decreased abundance depends upon rates of recruitment and growth outpacing rates of mortality. These species have rapid growth rates and high potential for propagation via fragmentation. However, while fragmentation is an excellent life history strategy for recovery from physical disturbance, it is not as effective when fragment sources (i.e., large extant colonies) are scarce.

Thus, it is anticipated that successful sexual reproduction will need to play a major role in Atlantic *Acropora* spp. recovery (Bruckner 2002). Meanwhile, there is substantial evidence to suggest that sexual recruitment of both elkhorn and staghorn corals is currently compromised. Reduced colony density in these broadcast-spawning, self-incompatible species, compounded in some geographic areas by low genotypic diversity, suggests that fertilization success and consequently, larval availability, has been reduced. In addition, appropriate substrate available for fragments to attach to is likely reduced due to changes in benthic community structure on many Caribbean reefs. Coupled with impacts from coastal development (i.e., dominance by macroalgal, turf, and/or sediment-coated substrates), these factors are expected to further reduce successful larval recruitment below an appropriate scale that can compensate for observed rates of ongoing mortality.

Species at reduced abundance are at a greater risk of extinction due to stochastic environmental and demographic factors (e.g., episodic recruitment factors). Both acroporids have persisted at extremely reduced abundance levels (in most areas with quantitative data available, less than 3 percent of prior abundance) for at least two decades.

The major threats (e.g., disease, elevated sea surface temperature, and hurricanes) to elkhorn and staghorn corals' persistence are severe, unpredictable, likely to increase in the foreseeable future, and, at current levels of knowledge, unmanageable. However, managing some of the stressors identified as less severe (e.g., nutrients, sedimentation) may assist in decreasing the rate of elkhorn and staghorn corals' decline by enhancing coral condition and decreasing synergistic stress effects.

The impacts on elkhorn and staghorn corals from all of the above mentioned stressors could be exacerbated by reduced genetic diversity, which often results when species undergo rapid decline like *Acropora* spp. have in recent decades. This expectation is heightened when the decline is due to a potentially selective factor such as disease, in contrast to a less selective factor such as

hurricane damage, which will likely cause disturbance independent of genotype. If the species remain at low densities for prolonged periods of time, genetic diversity may be significantly reduced. Thus, given the current dominance of asexual reproduction, the rapid decline (largely from a selective factor), and the lack of rapid recovery of elkhorn and staghorn corals, it is plausible that these species have suffered a loss of genetic diversity that could compromise their ability to adapt to future changes in environmental conditions. No quantitative information is available regarding genetic diversity for either species.

Table 3. Factors affecting the species.

Natural abrasion and breakage Source: storm events	Disease Source: undetermined/understudied
Sedimentation Source: land development/run-off dredging/disposal sea level rise major storm events	Anthropogenic abrasion and breakage Source: divers vessel groundings anchor impact fishing debris
Temperature Source: hypothermal events global climate change power plant effluents ENSO* events	Predation Source: overfishing natural trophic reef interactions
Nutrients Source: point-source non-point-source	Loss of genetic diversity Source: population decline/bottleneck
Competition Source: overfishing	Contaminants Source: point-source non-point-source
Sea level rise Source: global climate change	CO₂ Source: fossil fuel consumption
	Sponge boring Source: undetermined/understudied

* El Niño-Southern Oscillation

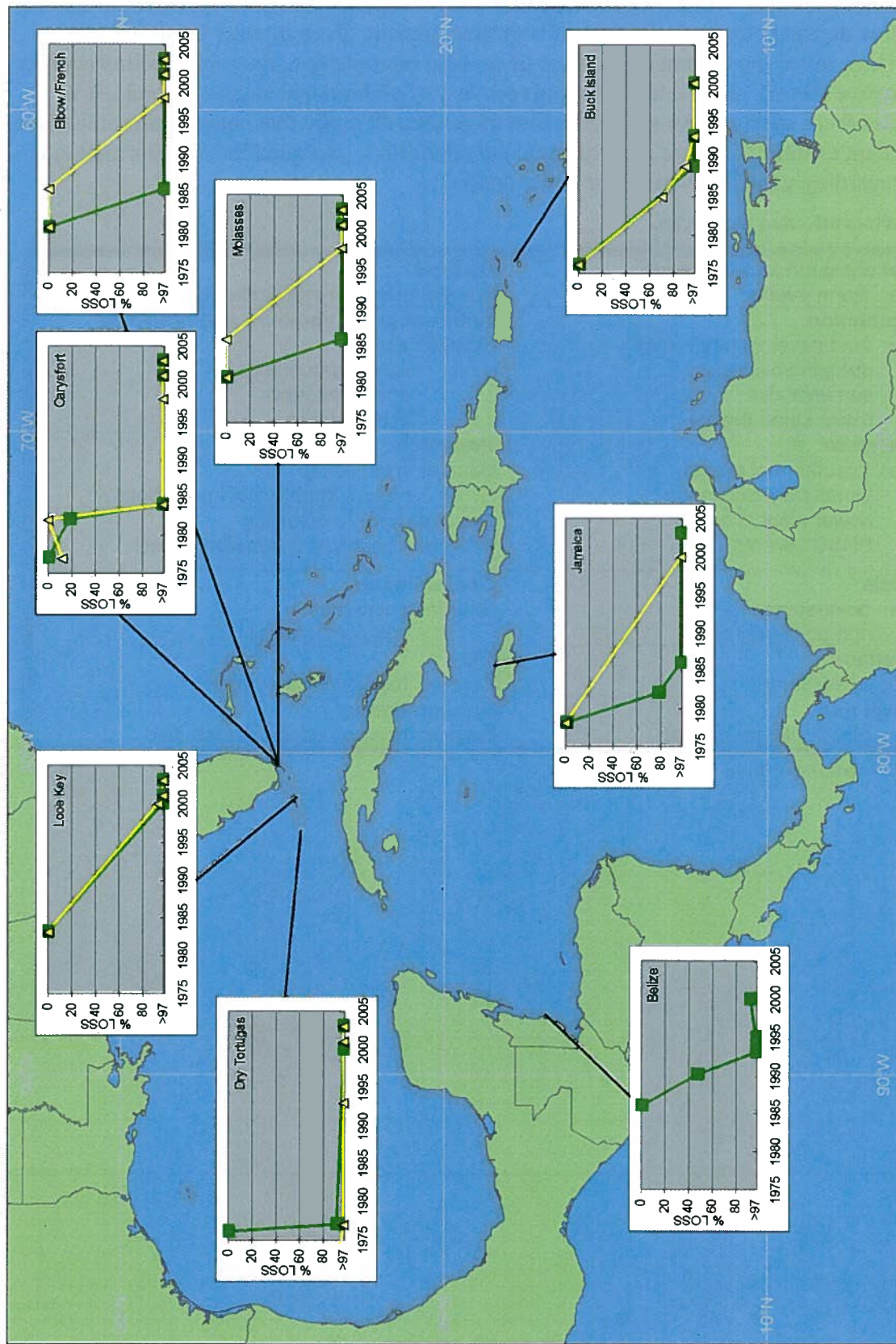


Figure 2. Percent loss of staghorn coral (green squares) and elkhorn coral (yellow triangles) throughout the Caribbean for all locations (n=8) where quantitative trend data exist. Shaded areas on map illustrate the general range of elkhorn and staghorn corals (*Acropora* BRT 2005).

5.0 Environmental Baseline

This section identifies the effects of past and ongoing human and natural factors leading to the current status of the species, their habitat, and ecosystem within the action area. The environmental baseline is a snapshot of the action area at a specified point in time and includes state, tribal, local, and private actions already affecting the species, or that will occur contemporaneously with the consultation in progress. Unrelated federal actions affecting the same species or critical habitat that have completed formal or informal consultation are also part of the environmental baseline, as are federal and other actions within the action area that may benefit listed species or critical habitat.

The environmental baseline for this opinion includes the effects of several activities that affect the survival and recovery of elkhorn and staghorn corals in the action area that may be affected by the proposed action.

5.1 Status of Elkhorn and Staghorn Coral Within the Action Area

The action area comprises most of the U.S. portion of the range of staghorn and elkhorn corals. All four of the geographic areas (Florida, St. Thomas/St. John, St. Croix, and Puerto Rico) located off the United States where listed corals occur and where critical habitat is designated are within the action area. Elkhorn and staghorn coral are found in varying densities throughout the action area.

Florida

In the Florida Area, a 2007 synoptic survey conducted by the University of North Carolina – Wilmington reports that elkhorn and staghorn coral were observed in the general survey area at approximately 10 percent and 23 percent, respectively, of the 235 reef sites surveyed throughout most of the Florida Reef Tract (minus the Marquesas Keys and the Dry Tortugas further west). The survey included sites in all of the FKNMS zones except for Newfound Harbor Sanctuary Preservation Area (SPA) (Miller et al. 2007). In 2009, another synoptic survey conducted by Miller et al. (2009) reported that both *Acropora* coral species exhibited distribution and abundance patterns similar to the surveys conducted in 2007 and 2008.

U.S.V.I. (St. Thomas/St. John, St. Croix)

Data from the U.S.V.I. indicate that elkhorn coral is no longer the dominant species and only standing dead skeletons or broken dead fragments remain on many shallow reefs. Data from Thatch Cay, however, indicate that elkhorn coral colonies range in age from recent recruits to colonies up to 100 years old, assuming linear growth. The percent cover of elkhorn corals around Thatch Cay varies between 10 percent and 60 percent. Density of elkhorn corals is up to one colony per 2 m². In addition to the loss of elkhorn coral, monitoring data from around the U.S.V.I. indicate that staghorn coral has virtually disappeared from the north side of Buck Island, St. Croix, and only a few localized areas off the southern reef contain staghorn coral, representing 2 to 3 percent of the coral cover in these areas (Rogers et al. 2002). Data from other monitoring studies around St. Croix indicate that staghorn coral is now rare around St. Croix and only isolated colonies, though numerous, exist around St. John (Rogers et al. 2002, Rogers et al. 2008). A survey in 2003 found that mixed stands of elkhorn and staghorn corals and their hybrid (*Acropora prolifera*) occur around Hans Lollick Island and Flat Cay, and Cocus Point, St.

Thomas (percent cover of living *Acropora* spp. between 11 percent and 13 percent); and Inner Brass Island, Botany Bay, and Caret Bay, St. Thomas (percent cover of living *Acropora* spp. between 6 percent and 8 percent) (Rogers et al. 2008). However, surveys of fragments of staghorn coral from nearshore areas of St. Thomas and outlying cays indicate that colonies of these corals were once much more abundant than the numbers recorded in the 2003 survey. Staghorn coral in the action area typically is found only in small, scattered colonies, except for one location off the coast of St. John (Saba Island) and the thickets around Thatch Cay. The percent cover of staghorn coral around Thatch Cay varies between 5 and 20 percent. Density of staghorn corals around Thatch Cay is up to one colony per 10 m². Both elkhorn and staghorn corals suffered widespread mortality associated with a widespread bleaching event in 2005, and current monitoring data does not indicate significant recovery (Woody et al. 2008, Rothenberger et al. 2008). Overall, colonies of Atlantic *Acropora* spp. have declined by up to 98 percent, and live colonies were no longer present at many study sites in the U.S.V.I. following the 2005-2006 bleaching event.

Puerto Rico

In Puerto Rico, well-developed and dense thickets of staghorn coral were present through the late 1970s at many reefs surrounding the main island, and also the offshore islands of Mona, Vieques and Culebra (Almy and Carrión-Torres 1963, McKenzie and Benton 1972, Goenaga and Cintrón 1979, Boulon 1980). Later, in 1978-79 during an island-wide survey, staghorn coral was found on only 20 percent of those reefs (Bruckner 2002).

Unfortunately quantitative trend data sufficient for a case study to depict trends in staghorn abundance or distribution are not available from Puerto Rico. More recent description of the status of staghorn coral in Puerto Rico can be found in Bruckner (2002); a few other studies are summarized below:

- Prior to Hurricane David in 1979, 20 random 0.6 m² photoquadrats were selected from each of ten 40-m long transects parallel to the depth contours across the reef (16.7 to 19.2 m depth). Based on analysis of point count data, staghorn coral had a mean total cover of 31.1 percent (range of 9.9 to 56.9 percent); after the storm, total cover of staghorn coral dropped to a mean of 0.90 percent (range of 0.02 to 2.7 percent) (Boulon unpubl. data).
- With the exception of a few reefs in the southwest and isolated offshore locations, the dense, high profile, monospecific thickets of both staghorn and elkhorn corals have disappeared from Puerto Rico coral reefs (Weil et al. unpublished data).
- In the summer of 2004, there was an epidemic outbreak of white pox disease at Los Corchos coral reef in Culebra, Puerto Rico. Prior to the outbreak, coral cover on the reef reached values of 80 percent. However, three weeks after Tropical Storm Jeanne, between 80 and 90 percent of the staghorn coral colonies at permanent monitoring sites at Los Corchos were already dead or dying; likely as a result of impacts from both disease and storm damage (Rogers, unpublished data).

In 2005, a major bleaching event was recorded in the Caribbean that led to coral mortality throughout the Caribbean. During that event, elkhorn and staghorn corals bleached at

frequencies of approximately 20 percent and 75 percent, respectively, at 12 monitored locations in Puerto Rico (Garcia-Sais et al. 2008). Further, near Culebra Island, almost 100 percent of staghorn colonies suffered partial to complete mortality due to bleaching (Garcia-Sais et al. 2008). Similar to the situation in the U.S.V.I., this bleaching event was followed by a massive white plague-like disease outbreak that caused mass mortality and resulted in a net decline in living coral cover between 20 percent and 60 percent at surveyed reefs off the east coast within a period of approximately six months.

5.2 *Factors Affecting the Species Environment Within the Action Area*

Numerous activities funded, authorized, or carried out by federal agencies have been identified as threats and may affect elkhorn and staghorn corals in the action area. Few other biological opinions have been conducted that can be referenced and the following identified activities are based on agency knowledge of ongoing actions that may require re-initiation of ESA consultation or new consultations based on the listing.

- NMFS develops fishery management plans and fishery regulations that govern fishing activities that may physically interact with the species and its habitat or that may alter ecosystem functions and the resilience of these systems through the removal of keystone species (e.g., herbivorous fish).
- The National Park Service (NPS) regulates activities that are conducted in shallow-water coral reef areas including collection of coral, alteration of the seabed, discharges, boating, anchoring, fishing, recreational SCUBA diving, snorkeling, and scientific research within the boundaries of their designated parks and monuments. The Department of the Interior, including NPS, along with NOAA and the U.S. Environmental Protection Agency (EPA), also conduct research activities using federal research vessels as part of coral reef monitoring activities.
- National Ocean Service (National Marine Sanctuary Program), National Park Service (NPS), U.S. Fish & Wildlife Service (FWS), Florida Fish and Wildlife Conservation Commission, Puerto Rico DNER, and the U.S.V.I. DPNR issue permits for the collection of corals and other marine species for scientific and educational purposes. Through the ESA section 4(d) regulations promulgated by NMFS to conserve elkhorn and staghorn corals, NMFS recognized that the permit processes for these agencies are consistent with ESA Section 10 permit requirements, and an additional permit from NMFS is not required for scientific research and enhancement activities involving either species of listed corals.
- The U.S. Coast Guard, through its Marine Event Program, permits events such as sailing tournaments, speed-boat races, fishing tournaments, fireworks displays, and swimming competitions that could result in accidental groundings or accidental spills of petroleum products in areas containing listed corals and their designated critical habitat.
- The COE and the EPA permit discharges to surface waters through shoreline and riparian disturbances. These disturbances (whether in the riverine, estuarine, marine, or floodplain environment) result in discharges to surface waters that may retard or prevent the reproduction, settlement, reattachment, and development of listed corals (e.g., land development and run-off, and dredging and disposal activities, result in direct deposition

of sediment on corals, shading, and lost substrate for fragment reattachment or larval settlement).

5.2.1 Fisheries

Several types of fishing gears used within the action area may adversely affect elkhorn and staghorn corals. Longline, other types of hook-and-line gear, and traps have all been documented as interacting with corals in general, though no data specific to listed corals is available. Available information suggests hooks and lines can become entangled in reefs, resulting in breakage and abrasion of corals. Traps have been found to be the most damaging, as well as the most widely used gear in the action area. A study of the trap fishery in U.S.V.I. found that, while most fishers deployed traps in seagrass or algae, sand, or coral rubble, a few fishers targeted corals (Sheridan et al. 2006), resulting in habitat impacts. However, less than 20 percent of the traps set in depths less than 30 m were in contact with hard or soft corals or sponges and damage was mainly at a scale less than the total trap footprint (Sheridan et al. 2005). Lost traps and illegal traps were found to result in greater impact to coral habitat because they cause continuous habitat damage until they degrade. For all fisheries for which there is a fishery management plan (FMP) or for which any federal action is taken to manage that fishery, impacts are evaluated under Section 7 of the ESA. A Section 7 consultation for the Gulf of Mexico and South Atlantic Spiny Lobster Fisheries was completed in 2009. NMFS determined that take resulting from continued operation of the lobster trap fishery would not jeopardize the continued existence of either staghorn or elkhorn corals. Further, NMFS recently reinitiated consultation on the Caribbean Fishery Management Council's Caribbean Reef Fish FMP.

5.2.2 Vessel Operations

Potential sources of adverse effects from federal vessel operations in the action area include operations of the USCG, EPA, NOAA, and the NPS. Through the Section 7 process, where applicable, NMFS will continue to establish conservation measures for agency vessel operations to avoid or minimize adverse effects to listed species. At the present time, however, they present the potential for some level of interaction.

5.2.3 ESA Permits

Regulations developed under the ESA allow for the issuance of permits allowing take of certain ESA-listed species for the purposes of scientific research under Section 10(a)(1)(A) of the ESA. In addition, Section 6 of the ESA allows NMFS to enter into cooperative agreements with states to assist in recovery actions of listed species. Prior to issuance of these permits, the proposal must be reviewed for compliance with Section 7 of the ESA. The Section 4(d) regulations promulgated by NMFS to establish "take" prohibitions for listed elkhorn and staghorn corals enables permits issued by the National Ocean Service (National Marine Sanctuary Program), NPS, FWS, Florida Fish and Wildlife Conservation Commission, Puerto Rico DNER, and the U.S.V.I. DPNR to be used in lieu of Section 10 permits issued by NMFS for activities meant to promote scientific research on Atlantic *Acropora* spp. and enhancement of the species.

5.2.4 Vessel Traffic

Commercial and recreational vessel traffic can adversely affect listed corals through propeller scarring, propeller wash, and accidental groundings. Based on information from NOAA RC and NOAA ResponseLink, reports of accidental groundings are becoming more common,

particularly in U.S.V.I. and Puerto Rico. These groundings are often on reefs colonized by listed corals due to the shallow depth requirements of these species, in particular elkhorn corals. Private vessels in the action area participating in marine events, in particular events involving motorized vessels, are an additional threat to listed corals. NMFS and the USCG completed a Section 7 consultation for the Caribbean Marine Event Program for all annually occurring marine events in USVI and Puerto Rico. As a result of this consultation, the USCG now includes guidelines to avoid and minimize potential impacts of marine events to listed corals and their habitat as permit conditions the event participants must follow. However, there are numerous other commercial and recreational vessels that transit, anchor, and moor in the action area. In addition, the proliferation of vessels is associated with the proliferation and expansion of docks, the expansion and creation of port facilities, and the expansion and creation of marinas. Through the Section 7 process for dock, port, and marine construction activities under the jurisdiction of the COE, NMFS will continue to establish conservation measures to ensure that the construction and operation of these facilities avoids or minimizes adverse effects to listed species.

5.2.5 Coastal Development

Anthropogenic sources of marine pollution, while difficult to attribute to a specific federal, state, local or private action, may indirectly affect corals in the action area. Sources of pollutants in the action area include atmospheric loading of pollutants such as PCBs, storm water runoff from coastal towns, and runoff into ghuts and rivers that empty into bays and groundwater. Nutrients, contaminants, and sediment from point and non-point sources cause direct mortality and the breakdown of normal physiological processes. Additionally, these stressors create an unfavorable environment for reproduction and growth.

Diseases have been identified as the major cause of *Acropora* spp. decline. Although the most severe mortality resulted from an outbreak in the early 1980s, diseases (i.e., white band disease) are still present in *Acropora* populations and continue to cause mortality.

The pathological effects of oil spills have been documented in laboratory and field studies of corals, although effects depend on the species' tolerance and level of exposure (Hoff 2001). Following a crude oil spill in Las Minas Bay, Panama, short-term mortality to corals and long-term sublethal impacts to reproduction and growth were documented to last five years or more (Guzman et al. 1994).

5.2.6 Natural Disturbance

Hurricanes and large coastal storms can also significantly harm elkhorn and staghorn corals. Due to their branching morphologies, they are especially susceptible to breakage from extreme wave action and storm surges. Historically, large storms potentially resulted in asexual reproductive events, if the fragments encountered suitable substrate, attached, and grew into new colonies. However, recently, the amount of suitable substrate has been significantly reduced; therefore, many fragments created by storms die. Hurricanes are also sometimes beneficial, if they do not result in heavy storm surge, during years with high sea surface temperatures, as they lower the temperatures providing fast relief to corals during periods of high thermal stress (Heron et al. 2008).

5.3 *Conservation and Recovery Actions Benefiting Listed Corals*

NMFS has implemented a Section 4(d) regulations to establish “take” prohibitions for listed corals. The CFMC has established regulations prohibiting the use of bottom-tending fishing gear in seasonally and permanently closed fishing areas containing coral reefs in federal waters of the Exclusive Economic Zone (EEZ). U.S.V.I. is moving toward similar regulations for both commercial and recreational fishers, and has already established a ban on the use of gill and trammel nets, with the exception of surface nets for catching bait fish. In addition to regulations, education and outreach activities, as part of the NOAA Coral Reef Conservation Program (CRCP), as well as through NMFS’ ESA program, are on-going through the Southeast Regional Office.

A draft recovery plan for elkhorn and staghorn corals is in preparation. A recovery team comprised of fishers, scientists, managers, and agency personnel from Florida, Puerto Rico, and USVI, and federal representatives has been convened and is working towards creating a draft recovery plan for public review based upon the latest and best available information.

5.3.1 *Regulations Reducing Threats to Listed Corals*

Numerous management mechanisms exist to protect corals or coral reefs in general. Existing federal regulatory mechanisms and conservation initiatives most beneficial to branching corals have focused on addressing physical impacts, including damage from fishing gear, anchoring, and vessel groundings. The Coral Reef Conservation Act and the Magnuson-Stevens Act Coral and Reef Fish Fishery Management Plans (South Atlantic, Caribbean) require the protection of corals and prohibit the collection of hard corals. Depending on the specifics of zoning plans and regulations, marine protected areas (MPAs) can help prevent damage from collection, fishing gear, groundings, and anchoring.

On October 29, 2008, NMFS published a final Section 4(d) rule extending the Section 9 “take” prohibitions to listed elkhorn and staghorn corals. These prohibitions include the import, export, or take of elkhorn or staghorn corals for any purpose, including commercial activities. The 4(d) rule has exceptions for some activities, including scientific research and species enhancement, and restoration carried out by authorized personnel. On November 26, 2008, NMFS published a final rule designated critical habitat for listed elkhorn and staghorn corals. The critical habitat designation requires that all actions with a federal nexus ensure that the adverse modification of critical habitat will not occur as part of a Section 7 consultation with NMFS for the action.

5.3.2 *Other Listed Coral Conservation Efforts*

The NOAA Coral Reef Conservation Program provides funding for several activities with an education and outreach component for informing the public about the importance of the coral reef ecosystem and the status of listed corals. The Southeast Regional Office of NMFS has also developed outreach materials regarding the listing of elkhorn and staghorn corals, the 4(d) regulations, and the designation of critical habitat. These materials have been circulated to constituents during education and outreach activities and public meetings, and as part of other Section 7 consultations, and are readily available on the website:

<http://sero.nmfs.noaa.gov/pr/esa/acropora.htm>.

5.4 Summary and Synthesis of Environmental Baseline

In summary, several factors are presently adversely affecting elkhorn and staghorn corals in the action area. These factors are ongoing and are expected to occur contemporaneously with the proposed action:

- Disease outbreaks;
- Major storm events;
- Upland and coastal activities will continue to degrade water quality and decrease water clarity necessary for coral growth;
- Dredge-and-fill activities;
- Interaction with fishing gear;
- Vessel traffic will continue to result in abrasion and breakage due to accidental groundings and poor anchoring techniques; and
- Poor diving and snorkeling techniques will continue to abrade and break corals.

These activities are expected to combine to adversely affect the recovery of elkhorn and staghorn coral throughout their ranges, and in the action area.

6.0 Effects of the Action

As described below, NMFS believes that the proposed action may adversely affect elkhorn and staghorn corals, which are listed as threatened species under the ESA. However, the purpose of the scientific research, enhancement, and restoration activities conducted and funded by NOAA RC is to produce research results or habitat conditions (e.g., restoration of physical impacts) that will benefit these species. On October 29, 2008, NMFS finalized an ESA Section 4(d) rule that prohibits most forms of take of these species (73 FR 64264). The regulations provide an exception from the ESA Section 9 export and take prohibitions for permits issued by several state, territorial, and federal natural resource agencies for certain scientific research or enhancement activities conducted on *Acropora* spp. in Florida, Puerto Rico, and U.S.V.I. The proposed research and enhancement actions require obtaining permits from one or more of the listed entities prior to commencement of individual projects and/or awarding of funding for individual projects. The emergency restoration activities implemented by NOAA RC under the authority of the CWA, CERCLA, and OPA are excepted from the ESA Section 9 prohibitions when the restoration activity described in this prohibition is implemented for either of the two acroporid corals. The 4(d) regulations define an excepted restoration activity as “the methods and processes used to provide aid to injured individual elkhorn or staghorn corals” (50 CFR § 223.208(c)(2)). Given that (1) the intent of this programmatic opinion is to cover only coral take that is excepted under the 4(d) regulations for the conservation of listed corals (including restoration activities); and (2) the research or enhancement activities discussed within this programmatic opinion are required to have one of the permits included in the 4(d) regulations for the conservation of listed corals in order to be carried out or funded, the take resulting from these activities does not constitute prohibited take. Therefore, no project-specific incidental take statements and RPMs will be issued; however, because the action will result in adverse effects to the threatened corals, we must evaluate whether the action is likely to jeopardize the continued existence of either species.

The proposed action consists of 4(d)-excepted restoration activities conducted by the NOAA RC (in response to prohibited oil or substance releases or vessel groundings), and funding and implementing of 4(d)-excepted scientific research and enhancement activities directed at elkhorn and staghorn corals in Florida, Puerto Rico, and the U.S.V.I. by NOAA RC through its Community Restoration Program (CRP). As discussed above, the priorities of both CRP and DARRP relative to listed corals are: (1) active enhancement of listed coral populations through the expansion of in-water nursery efforts; (2) implementation of restoration activities to increase herbivory in coral reef ecosystems; (3) development and maintenance of emergency response and restoration capacity; (4) removal or stabilization of rubble and debris affecting healthy corals; and (5) funding and implementation of restoration actions in local watershed management plans associated with priority *Acropora* spp. reefs. Individual proposed research and restorations projects are reviewed for scientific merit and evaluated on several criteria, including the value of the activity to the NOAA RC priorities; duration of the proposed activity; methods and potential impacts; indirect, secondary, and cumulative effects of the activity; whether it is necessary for the activity to be conducted within the proposed area; and professional and financial qualifications of the applicant or grantee.

Excepted research, enhancement, and restoration activities directed at *Acropora* spp. conducted and/or funded by NOAA RC will typically involve the following activities:

1. Tissue sampling, which involves the collection of one polyp (~ 1 cm² of tissue) or larger sections (~ 2-10 cm branch tip) using hand tools such as a syringe, shears, or pliers. The smaller samples (~ 1 cm² of tissue) typically are used for genotyping coral colonies, and the larger samples (~ 2-10 cm branch tip) typically are used for propagating coral colonies.
2. Collection of naturally-available coral fragments (e.g., picking up loose fragments from the sea floor by hand). Naturally-available fragments taken with hand tools (see above) are often subsequently reattached during restoration, managed in a nursery, or transplanted to nearby reef.
3. Placement, reattachment, or stabilization of fragments, coral colonies, or nursery-reared corals using epoxy, cement, or mechanical devices (e.g., plastic cable ties). Corals may be reattached either to the sea floor or to a base (e.g., a concrete disk or limestone), which is then affixed to the sea floor.
4. Removal of corallivorous grazers from coral colonies by hand.
5. Stabilization and restoration of physical impacts to natural consolidated hard substrate or dead coral skeleton damaged resulting from vessel groundings, anchor damage, and storms. Physical impacts may consist of fragmentation of substrate, dislodging or overturning of large pieces of substrate, or pulverization. Stabilization techniques include the use of cement, rebar, concrete nails, and sometimes, limestone.
6. Marking of coral colonies using plastic tags, nails, flagging tape, or other identifying markers to areas of bare substrate immediately adjacent to the coral colony. Rarely are these markers

placed directly on the coral colony. Various monitoring activities (e.g., growth, disease, spawning potential) require marking coral colonies.

7. Measuring coral colonies using hand-placed calipers or flexible tapes, which briefly (< 5 minutes) remain in contact with the coral colony. This activity is employed during various monitoring activities, including monitoring of coral colonies to measure growth or spread of disease.

Take of *Acropora* spp. will result from some permitted research, enhancement, and restoration activities; however, the purpose of the activities conducted and/or funded by NOAA is to recover the species through restoration of damaged coral populations and reef ecosystems. Tissue sampling typically involves the collection of polyps (approximately 1 cm² tissue or skeletal sample) or small branch tips (approximately 2-10 cm in length) using hand tools, such as syringes or pliers. Reattachment of branches or colonies usually involves the use of epoxy or cement, with mechanical devices such as cable ties being used less often. Markers on coral branches or colonies are generally placed adjacent to colonies and rarely on the coral. Corallivorous grazers (e.g., fishes and invertebrates) also are removed from corals by hand. Measuring and monitoring of corals involves the temporary hand-placement of flexible transect tapes on corals. Projects involving restoration or transplant experiments are confined, whenever possible, to coral fragments produced naturally via fragmentation, and monitoring of parent colonies is often required to track lesion healing and new growth over time.

NMFS believes that, overall, the 4(d)-excepted research, enhancement, and restoration activities directed at *Acropora* spp. that are conducted and/or funded by NOAA RC, and take of the species that would occur during the course of these activities, will have temporary effects to these species. In our evaluation of scientific research permitting programs eligible for the export and take exemptions from the ESA Section 9 prohibitions extended by the proposed ESA 4(d) regulations for elkhorn and staghorn corals, NMFS found that the coral research (e.g., gene flow, disease etiology) and enhancement activities (e.g., coral nurseries, habitat enhancement) permitted by natural resource agencies within the action area provide for the conservation of these species. These permits are required for the proposed scientific research and enhancement activities conducted and/or funded by NOAA RC. Additionally, a comparison of the permitting requirements of these agencies for research activities in Florida, Puerto Rico, and U.S.V.I. indicates that the permit procedures are as protective as the requirements for an ESA Section 10(a)(1)(A) scientific research permit. The specific effects of research and restoration activities directed at *Acropora* spp. conducted and/or funded by NOAA RC on coral colonies, and on reproductive units of elkhorn and staghorn corals (e.g., gametes and asexual fragments) are discussed below.

6.1 Effects of the Action on Elkhorn or Staghorn Coral Colonies

NMFS believes that the permitted collection of small tissue samples (i.e., polyps and/or branch tip fragments) using hand tools such as a syringe, shears, or pliers will have temporary effects on the coral colonies from which samples are collected. Prior to collection of small tissue samples, NOAA RC staff will ensure during the project design phase that these collections, if required, are minimized in quantity and sample dimension, dispersed geographically, and authorized with the

appropriate permit(s). Thus, the “sample collection load” is dispersed across several coral colonies at several locations, and no one coral colony is relied upon to provide a single large tissue sample. Given the limits placed on tissue sample collection by NOAA RC, the required permits, and the PDCs, the effect of this activity on elkhorn or staghorn coral colonies is a small reduction in biomass. This reduction in coral biomass caused by the collection of small tissue samples, however, is expected to be temporary, with recovery through tissue replacement and/or coral colony growth. In elkhorn coral, lesions at the point of fragment detachment have been shown to begin regeneration within two weeks of fragmentation (Lirman 2000), with regeneration rates being positively correlated with decreasing size of lesion and proximity to growing tip. Lirman (2000) showed that a 3-cm² lesion regenerated completely within 100 days. Additionally, the collection of small tissue samples almost always occurs at the outermost portion of the branch tip. Soong and Lang (1992) observed that, in *A. cervicornis*, large polyps and basal tissues located 1.0 to 4.5 cm (0.4 to 1.8 inches) from the colony base were infertile, and larger eggs were located in the mid-region of colony branches. Gonads located within 2 to 6 cm (0.8 to 2.4 inches) of the colony’s branch tips always had smaller eggs than those in the mid-region (Soong and Lang 1992). In *A. palmata*, small eggs were found in the whole colony, while infertile areas were observed in the encrusting base and along the growing edges of branches (Soong and Lang 1992). Additionally, larger colonies of both species (as measured by surface area of the live colony) have higher fertility rates (Soong and Lang 1992). Thus, the collection of small tissue samples is not expected to have a significant effect on coral colonies’ sexual reproduction. In summary, given that collected tissue samples are small in size (anywhere from 1 polyp to a 10-cm branch tip) relative to coral colony size, that the effects of collecting tissue samples are temporary, and that tissue samples are almost always collected from the outermost portion of the coral branch or branch tip where smaller eggs are found, it is not likely that the survival or reproductive output of elkhorn or staghorn coral colonies will be measurably reduced by the collections conducted or funded by NOAA RC.

NMFS believes that marking of coral colonies, removal of corallivorous grazers from coral colonies, measurement of coral colonies, or monitoring of coral colonies during the course of NOAA RC conducted or funded activities will have insignificant effects on coral colonies. None of the tools or methods used during these activities requires the permanent removal of tissues (i.e., polyps and/or branch tip fragments) or permanent attachment of materials to coral colonies, except for some coral colony markers. Markers attached directly to coral colonies are rarely used, and in the past, coral colonies have shown rapid tissue overgrowth of the marker. Additionally, hand-placed calipers or flexible transect tapes, used for measuring and video monitoring purposes, remain in contact with small portions of coral colonies for brief periods lasting 30 minutes or less. Given the temporary and superficial nature of these activities, it is not likely that elkhorn or staghorn coral colonies will be injured or killed by the collection, monitoring, and measuring activities mentioned above, which are conducted or funded by NOAA RC.

NMFS believes that placement, reattachment, or stabilization of fragments, coral colonies, or nursery-reared corals using epoxy, cement, or mechanical devices (e.g., plastic cable ties) will have positive effects on elkhorn and staghorn coral colonies. Coral colonies are typically dislodged or knocked over because of storms, hurricanes, boat groundings, or anchoring. Depending on the degree of damage and the availability of suitable reattachment substrate, a

coral colony may reattach on its own. The likelihood of coral colony survival increases, however, with artificial stabilization by reducing coral colony mortality due to abrasion and additional breakage. Additionally, Lindahl (2003) showed that skilled handling does not significantly affect coral fragments or, by extension, coral colonies. Given that these activities increase the likelihood of coral colony survival, NMFS believes that the survival and reproductive output of elkhorn or staghorn coral colonies will be increased by reattachment or stabilization activities conducted or funded by NOAA RC.

NMFS believes that outplanting of nursery-reared colonies of elkhorn and staghorn corals onto the reef environment will result in positive effects on elkhorn and staghorn coral colonies. Prior to outplanting nursery-reared colonies of listed corals, NOAA RC staff will ensure during the project design phase that these outplantings are of a minimum size, exhibit good health, and placed on the reef using field-tested methods. NOAA RC staff also will ensure during the project design phase that site selection for planned outplantings will be diverse and will take into account the surrounding reef environment. Last, dominance of one genotype at any one particular site will be limited, and the diversity of genotypes available in nursery-reared coral colonies will be maximized. Given the limits placed on outplanting nursery-reared colonies by NOAA RC, the required permits, and the PDCs, the effect of this activity on wild elkhorn or staghorn coral colonies is likely to be insignificant. Further, outplanting of nursery-reared elkhorn and staghorn coral colonies to wild reefs is likely to result in beneficial effects to wild elkhorn and staghorn corals including enhancement of reproductive output.

There are potential positive effects of permitted activities on elkhorn and staghorn coral colonies including potentially reduced coral colony tissue destruction caused by corallivorous grazers – and therefore increased survival and reproduction potential – and reduced coral colony mortality following natural or anthropogenic disturbances.

6.2 Effects of the Action on Reproductive Units (i.e., gametes and asexual fragments)

Collection of naturally-available fragments and/or collection of fragments using hand tools for research and restoration purposes will have positive and negative effects on the species. Collected asexual fragments are reattached during either restoration or transplant experiments. As identified in Section 3.2 (Life History) of this opinion, these species have rapid growth rates and high potential for propagation via asexual fragmentation. Asexual fragmentation of wild elkhorn and staghorn coral colonies is the dominant mode of reproduction, and results naturally from storm events (i.e., tropical storms and hurricanes). Highsmith (1982) describes fragmentation as an adaptive process for several reasons, including increased survival due to large size of offspring compared to a sexually produced offspring. In order for these fragments to survive, though, they must reattach to the substrate. The likelihood of successful reattachment and subsequent growth into a coral colony is low because of the limited availability of appropriate reattachment substrate (i.e., consolidated hardbottom). Fragments that do not reattach shortly after breaking off of coral colonies are highly susceptible to abrasion and further breakage. Thus, many asexual fragments that result from natural disturbances (e.g., hurricanes) and vessel groundings experience mortality. Fragments may be reattached and transplanted using epoxy, cement, or mechanical devices (e.g., plastic cable ties). Lindahl (2003) conducted a study on the effects of artificial stabilization and mechanical damages and found that coral

fragments were not significantly affected by skilled handling. Furthermore, artificial reattachment and stabilization of fragments increases the likelihood of fragment survival by reducing mortality due to abrasion and additional breakage. These stabilized, and likely monitored, fragments have a high probability for survivorship and for growing into coral colonies, which may contribute to an increase in numbers, reproduction, and distribution of elkhorn and staghorn coral colonies.

6.3 *Anticipated Aggregate Effects of the Action on Elkhorn and Staghorn Coral*

Scientific research, enhancement, and restoration activities directed at *Acropora* spp. conducted or funded by NOAA RC and resultant take of the species that would occur will have solely temporary effects on elkhorn and staghorn corals and will never result in mortality of whole coral colonies in the wild. Some research, enhancement, and restoration activities may result in positive benefits to these species. Permitted collection of tissue samples from elkhorn or staghorn coral colonies will result in a small reduction in coral biomass; however, this effect is expected to be temporary, with recovery through tissue replacement and/or coral colony growth. Removal of corallivorous grazers, and measuring, monitoring, or marking will have no detectable effect on coral colonies. These temporary and superficial activities are not likely to result in injury or death of wild elkhorn or staghorn coral colonies. Reattachment, stabilization, or transplantation of coral colonies or fragments will have positive effects on the species. Reattachment, stabilization, and transplantation of coral colonies or fragments will reduce mortality due to abrasion and breakage, and these activities are likely to result in increased survival and reproductive output of elkhorn and staghorn coral colonies and fragments. Transplanted fragments have a high probability for survivorship and for growing into coral colonies, which may contribute to an increase in numbers, reproduction, and distribution of elkhorn and staghorn coral colonies.

7.0 Cumulative Effects

Cumulative effects include the effects of future state, tribal, or local private actions that are reasonably certain to occur in the action area considered in this opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

No categories of effects beyond those already described in Sections 4.2 and 5.0 are expected in the action area. Activities affecting corals are highly regulated federally; therefore, any future activities within the action area will likely require ESA Section 7 consultation.

8.0 Jeopardy Analysis

This section considers the likelihood that the proposed action will jeopardize the continued existence of elkhorn or staghorn corals in the wild. To *jeopardize the continued existence of* is defined as “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02). The “Effects of the Action” section (Section 5.0) describes the effects of the take resulting from the proposed action on elkhorn and staghorn corals. Sections 4.0 and 6.0 help inform the context of

these effects, with respect to the environmental baseline and cumulative effects. The following jeopardy analysis first considers the effects of the action to determine if we would reasonably expect the action to result in reductions in reproduction, numbers, or distribution of these listed species. The analysis next considers whether any such reduction would in turn result in an appreciable reduction in the likelihood of survival of each species in the wild and the likelihood of recovery of each species in the wild.

In the following analyses, we demonstrate that no reduction in numbers, reproduction, or distribution is expected; therefore, the take of elkhorn or staghorn corals will not appreciably reduce the likelihood that the species will survive and recover in the wild.

As discussed in Section 6.0 (“Effects of the Action”), research, enhancement, and restoration activities directed at *Acropora* spp. conducted or funded by NOAA RC will not result in the mortality of any wild elkhorn and staghorn coral colonies. The proposed action will potentially result in an increased number of elkhorn and staghorn coral colonies because of the expected increased survival of reattached, stabilized, or transplanted fragments. Thus, the proposed action does not constitute a reduction in numbers of the species in the wild. Similarly, just as the proposed action will not measurably reduce sexual and asexual reproductive output of elkhorn or staghorn coral colonies, and the net effect of the action on coral reproduction is likely to be positive, the proposed action will not result in a reduction in elkhorn and staghorn coral reproduction. Furthermore, given that the action will not result in mortality of wild elkhorn or staghorn coral colonies, and that both species are present throughout their ranges, the proposed action will not result in a reduction in the distribution of elkhorn and staghorn corals.

Based on the above analysis, we have determined that the proposed action is not reasonably expected to cause an appreciable reduction in the likelihood of survival of these coral species in the wild.

The following analysis considers the effects of the take resulting from this proposed action on the likelihood of recovery in the wild. Although a recovery plan has not been drafted at this time, we consider the recovery vision statement from the *Acropora* Recovery Outline (available at <http://sero.nmfs.noaa.gov/pr/protres.htm>) relevant to analyze the effects on recovery:

Elkhorn and staghorn populations should be large enough so that reproducing individuals comprise numerous populations across their historical geographic range (wider Caribbean) and also should be large enough to protect the species’ genetic diversity. Threats to the species and habitat loss and degradation will be sufficiently abated to ensure a high probability of survival into the future.

The above analysis on the effects of the action on the likelihood of the species’ survival in the wild considered the current status of the species and effects of the amount of take anticipated for the species. We determined that no reduction in numbers, reproductive potential, or distribution will result from the proposed action. Research and restoration activities directed at *Acropora* spp. conducted or funded by NOAA RC will contribute to the identified recovery vision statement of increasing individuals within the population by improving our understanding of the status of and risks facing these species and by reducing mortality due to abrasion and breakage through the transplantation and reattachment of fragments and coral colonies. The data derived

from research activities conducted on *Acropora* spp. conducted or funded by NOAA RC will likely inform future recovery actions. Therefore, we have determined that the proposed action is not expected to reduce appreciably the likelihood of recovery of these coral species in the wild.

9.0 Conclusion

The proposed action consists of 4(d)-excepted scientific research, enhancement, and restoration activities directed at elkhorn and staghorn corals conducted or funded by NOAA RC in Florida, Puerto Rico, and the U.S.V.I. The proposed action includes PDCs that will be applicable to research, enhancement, and restoration projects covered by this programmatic consultation, effects anticipated given implementation of the PDCs, project-specific consultation procedures, an annual comprehensive review of operation of this programmatic consultation, and required monitoring and reporting requirements to ensure proposed actions are consistent with the programmatic consultation. After reviewing the current statuses of elkhorn and staghorn corals, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is NMFS' biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of elkhorn or staghorn corals. Because the proposed action does not include any prohibited incidental take, no incidental take statement is provided; moreover, no reductions in numbers, reproduction, or distribution of either threatened coral species is expected to result from the action.

10.0 Reinitiation of Consultation

As provided in 50 CFR Section 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (2) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion, or (3) a new species is listed or critical habitat designated that may be affected by the identified action.

11.0 Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

NMFS believes the following conservation recommendation furthers the conservation of elkhorn and staghorn corals. NMFS strongly recommends that this measure be considered and implemented, and requests to be notified of its implementation.

NMFS recommends that NOAA RC provide NMFS' Southeast Region PRD with the data collected, and any resulting publications, from all research permitted concerning elkhorn and

staghorn corals and their designated critical habitat, including research permitted that is not covered by this programmatic opinion.

12.0 Literature Cited

- Acropora* Biological Review Team. 2005. Atlantic *Acropora* Status Review Document. Report to National Marine Fisheries Service, Southeast Regional Office. March 3, 2005. 152 p + App.
- Adey, W.H. 1977. Shallow water Holocene bioherms of the Caribbean Sea and West Indies. Proceedings of the 3rd International Coral Reef Symposium 2: xxi-xxiii
- Adey, W.H. 1978. Coral reef morphogenesis: A multidimensional model. Science 202: 831-837.
- Almy, C.C. and Carrión-Torres, C. 1963. Shallow-Water Stony Corals of Puerto Rico. Caribbean Journal of Science.
- Baggett, L.S., Bright, T.J. 1985. Coral recruitment at the East Flower Garden Reef. Proceedings of the 5th International Coral Reef Congress 4: 379-384.
- Bak, R.P.M. 1977. Coral reefs and their zonation in the Netherland Antilles. AAPG Stud Geol 4: 3-16.
- Bak, R.P.M., Criens, S.R. 1982. Survival after fragmentation of colonies of *Madracis mirabilis*, *Acropora palmata* and *A. cervicornis* (Scleractinia) and the subsequent impact of a coral disease. Proceedings of the 4th International Coral Reef Symposium 1: 221-227.
- Bak, R.P.M., Engel, M. 1979. Distribution, abundance and survival of juvenile hermatypic corals (Scleractinia) and the importance of life history strategies in the parent coral community. Marine Biology 54: 341-352.
- Birkeland, C. 1977. The importance of rate of biomass accumulation in early successional stages of benthic communities to the survival of coral recruits. Proceedings of the 3rd International Coral Reef Symposium 1: 15-21.
- RH Boulon Jr. 1980. Patterns of coral community structure and species diversity of a submerged shelfedge reef off southwestern Puerto Rico: Mayaguez. University of Puerto Rico, unpublished Master's thesis.
- Bruckner, A.W. 2002. Proceedings of the Caribbean *Acropora* workshop: Potential application of the U.S. Endangered Species Act as a conservation strategy. NOAA Technical Memorandum NMFS-OPR-24, Silver Spring, MD .
- Cairns, S.D. 1982. Stony corals (Cnidaria: Hydrozoa, Scleractinia) of Carrie Bow Cay, Belize. In: Rutzler K, Macintyre IG (eds) The Atlantic barrier reef ecosystem at Carrie Bow Cay, Belize. Structure and communities. Smithsonian Contributions to Marine Science 12: 271-302

- Chiappone, M., Sullivan, K.M. 1996. Distribution, abundance and species composition of juvenile scleractinian corals in the Florida reef tract. *Bulletin of Marine Science* 58: 555-569.
- Davis, G.E. 1982. A century of natural change in coral distribution at the Dry Tortugas: A comparison of reef maps from 1881 and 1976. *Bulletin Marine Science* 32: 608-623.
- Dunne, R.P., Brown, B.E. 1979. Some aspects of the ecology of reefs surrounding Anegada, British Virgin Islands. *Atoll Research Bulletin* 236: 1-83.
- Dustan, P. 1985. Community structure of reef-building corals in the Florida Keys: Carysfort Reef, Key Largo and Long Key Reef, Dry Tortugas. *Atoll Research Bulletin* 288: 1-27.
- Dustan, P., Halas, J.C. 1987. Changes in the reef-coral community of Carysfort Reef, Key Largo, Florida: 1974 to 1982. *Coral Reefs* 6: 91-106.
- Garcia-Sais JR, Appeldoorn RS, Battista T, Bauer L, Bruckner A, Caldow C, Carrubba L, Corredor J, Diaz E, Lilyestrom C, Garcia-Moliner G, Hernandez-Delgado EA, Menza C, Morell J, Pait AS, Sabater J, Weil E, Williams E, Williams S. 2008. The state of coral reef ecosystems of Puerto Rico. In: Waddell JE, Clarke AM (eds) *The state of coral reef ecosystems of the United States and Pacific Freely Associated States: 2008*. NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team, Silver Spring MD, pp 75-116.
- Geister, J. 1977. The influence of wave exposure on the ecological zonation of Caribbean coral reefs. *Proceedings of the 3rd International Coral Reef Symposium* 1: 23-29.
- Ghiold, J., Smith, S.H. 1990. Bleaching and recovery of deep-water, reef-dwelling invertebrates in the Cayman Islands, BWI. *Caribbean Journal of Science* 26: 52-61.
- Gilmore, M.D., Hall, B.R. 1976. Life history, growth habits, and constructional roles of *Acropora cervicornis* in the patch reef environment. *Journal of Sedimentary Petrology* 46: 519-522.
- Gladfelter, E.H. 1982. Skeletal development in *Acropora cervicornis*: I. Patterns of calcium carbonate accretion in the axile corallite. *Coral Reefs* 1: 45-52.
- Goenaga, C., Cintron G. 1979. Inventory of the Puerto Rican Coral Reefs. Puerto Rico Department of Natural Resources, San Juan, Puerto Rico.
- Goldberg, W.M. 1973. The ecology of the coral-octocoral community of the southeast Florida coast: geomorphology, species composition and zonation. *Bulletin of Marine Science* 23: 465-488.
- Goreau, T.F. 1959. The ecology of Jamaican reef corals: I. Species composition and zonation. *Ecology* 40: 67-90.

- Goreau, T.F., Goreau, N.I. 1973. Coral Reef Project--Papers in Memory of Dr. Thomas F. Goreau. *Bulletin of Marine Science* 23: 399-464.
- Goreau, T.F., Wells, J.W. 1967. The shallow-water Scleractinia of Jamaica: revised list of species and their vertical range. *Bulletin of Marine Science* 17: 442-453.
- Goreau N.I., Goreau, T.J., Hayes, R.L. 1981. Settling, survivorship and spatial aggregation in planulae and juveniles of the coral *Porites porites* (Pallas). *Bulletin of Marine Science* 31: 424-435.
- Jaap, W.C. 1974. Scleractinian growth rate studies. *Proceedings of the Florida Keys Coral Reef Workshop*. Florida Department of Natural Resources Coastal Coordinating Council p 17.
- Jaap, W.C. 1979. Observation on zooxanthellae expulsion at Middle Sambo Reef, Florida Keys. *Bulletin of Marine Science* 29: 414-422.
- Jaap, W.C. 1984. The ecology of the south Florida coral reefs: a community profile. US Fish and Wildlife Service (139).
- Jaap, W.C., Lyons, W.G., Dustan, P., Halas, J.C. 1989. Stony coral (Scleractinia and Milleporina) community structure at Bird Key Reef, Ft. Jefferson National Monument, Dry Tortugas, Florida. *Florida Marine Research Publication* 46: 31.
- Kornicker, L.S., Boyd, D.W. 1962. Shallow-water geology and environments of Alacran Reef complex, Campeche Bank, Mexico. *Bulletin of American Association of Petroleum Geologists* 46: 640-673.
- Lewis, J.B. 1977. Suspension feeding in Atlantic reef corals and the importance of suspended particulate matter as a food source. *Proceedings of the 3rd International Coral Reef Symposium* 1: 405-408.
- Lighty, R.G., Macintyre, I.G., Stuckenrath, R. 1982. *Acropora palmata* reef framework: A reliable indicator of sea level in the western Atlantic for the past 10,000 years. *Coral Reefs* 1: 125-130.
- Lindahl, U. 2003. Coral reef rehabilitation through transplantation of staghorn corals: effects of artificial stabilization and mechanical damages. *Coral Reefs* 22: 217-223.
- Mckenzie F. and Benton M. 1972. Biological inventory of the waters and keys of north-east Puerto Rico. Department of Natural Resources, San Juan, P.R. Report 90 pp.
- Miller MW, Gleason A, McClellan D, et al. 2008. The State of Coral Reef Ecosystems of Navassa Island. In: J. E. Waddell and A. M. Clarke (eds) *The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008*. NOAA

Technical Memorandum NOS NCCOS 73. NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team, Silver Spring, MD, 569 pp

- Miller, S.L., Chiappone, M., and Rutton, L.M. 2007. 2007 Quick look report: Large-scale assessment of *Acropora* corals, coral species richness, urchins and *Coralliophila* snails in the Florida Keys National Marine Sanctuary and Biscayne National Park. Center for Marine Science, University of North Carolina-Wilmington, Key Largo, Florida.
- Miller, S.L., Chiappone, M., Rutton, L.M., and Swanson, D. 2008. Population Status of *Acropora* Corals in the Florida Keys. Poster Presentation at the 11th International Coral Reef Symposium, Ft. Lauderdale, Florida. July 7-11, 2008.
- Miller, S.L., Chiappone, M., and Rutton, L.M. 2009. Large-scale assessment of the abundance, distribution, and condition of benthic coral reef organisms in the Florida Keys National Marine Sanctuary – 2009 Quick look report and data summary. Center for Marine Science, University of North Carolina-Wilmington, Key Largo, Florida.
- Porter, J.W. 1976. Autotrophy, heterotrophy, and resource partitioning in Caribbean reef corals. *Amer Nat* 110: 731-742.
- Roberts, H., Rouse, J.J., Walker, N.D., Hudson, J.H. 1982. Cold-water stress in Florida Bay and northern Bahamas: A product of winter frontal passages. *Journal of Sedimentary Petrology* 52: 145-155.
- Rogers, C.S., Suchanek, T., Pecora, F. 1982. Effects of Hurricanes David and Frederic (1979) on shallow *Acropora palmata* reef communities: St. Croix, USVI. *Bulletin of Marine Science* 32: 532-548.
- Rogers CS, Gladfelter W, Hubbard DK, Gladfelter EH and 6 others. 2002. *Acropora* in the U.S. Virgin Islands: a wake or an awakening? In: Bruckner AW (ed) *Proc Caribbean Acropora Workshop*, April 16-18, 2002, Miami, FL. NOAA Tech Memo NMFS-OPR-24, p 99–122
- Rogers C.S., Miller J, Muller EM, Edmunds P, Nemeth RS, Beets JP, Friedlander AM, Smith TB, Boulon R, and Jeffrey, CFG et al. 2008. Ecology of Coral Reefs in the US Virgin Islands. In: Riegl BM and Dodge RE (ed) *Corals Reefs of the U.S.A. Volume 1*, 2008.
- Rothenberger P, Blondeau J, Cox C, Curtis S, Fisher W, et al. 2008. The State of Coral Reef Ecosystems of the U.S. Virgin Islands. In: Waddell JE, Clarke AM, editors. *The state of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008*. NOAA Technical Memorandum NOS NCCOS 73. pp. 29-73.
- Rylandsdam, K.W. 1983. Life histories and abundance patterns of colonial corals on Jamaican reefs. *Marine Ecology Progress Series* 13: 249-260.
- Sammarco, P.W. 1980. *Diadema* and its relationship to coral spat mortality: grazing,

- competition, and biological disturbance. *Journal of Experimental Marine Biology Ecology* 45: 245-272.
- Sammarco, P.W. 1985. The Great Barrier Reef vs. the Caribbean: Comparisons of grazers, coral recruitment patterns and reef recovery. *Proceedings of the 5th International Coral Reef Congress* 4: 391-397.
- Scatterday, J.W. 1974. Reefs and associated coral assemblages off Bonaire, Netherlands Antilles, and their bearing on Pleistocene and Recent reef models. *Proceedings of the 2nd International Coral Reef Symposium* 2: 85-106.
- Shinn, E.A. 1963. Spur-and-groove formation on the Florida Reef Tract. *Journal of Sedimentary Petrology* 33: 291-303.
- Shinn, E.A. 1966. Coral growth-rate: An environmental indicator. *Journal of Paleontology* 40: 233-240.
- Shinn, E.A. 1976. Coral reef recovery in Florida and the Persian Gulf. *Environmental Geology* 1: 241-254.
- Soong, K. 1991. Sexual reproductive patterns of shallow-water reef corals in Panama. *Coral Reefs* 49: 832-846
- Soong, K., Lang, J.C. 1992. Reproductive integration in coral reefs. *Biology Bulletin* 183: 418-431.
- Storr, J.F. 1964. Ecology and oceanography of the coral-reef tract, Abaco Island, Bahamas. *Geological Society of America Special Papers* 79, 98 p.
- Szmant, A.M. 1986. Reproductive ecology of Caribbean reef corals. *Coral Reefs* 5: 43-53.
- Tomascik, T. and Sander, F. 1987. Effects of eutrophication on reef-building corals. I. Structure of scleractinian coral communities on fringing reefs, Barbados, West Indies. *Marine Biology* 94: 53-75.
- Tunncliffe, V. 1981. Breakage and propagation of the stony coral *Acropora cervicornis*. *Proceedings of the National Academy of Science* 78: 2427-2431.
- Vaughan, T.W. 1915. The geological significance of the growth rate of the Floridian and Bahamian shoal-water corals. *Journal of the Washington Academy of Sciences* 5: 591-600.
- Wheaton, J.W., Jaap, W.C. 1988. Corals and other prominent benthic cnidaria of Looe Key National Marine Sanctuary, FL. *Florida Marine Research Publication* 43.
- Williams, E.H., Bunkley-Williams, L. 1990. The world-wide coral reef bleaching cycle and

related sources of coral mortality. Atoll Research Bulletin 335: 1-7.

Woody K. et al. 2008. Coral bleaching in the US Virgin Islands in 2005 and 2006. in Wilkinson C, Souter D (eds) Status of Caribbean coral reefs after bleaching and hurricanes in 2005. GCRMN, Townsville, pp 68-72



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040

June 28, 2013

Ms. Caitlin Lustic
The Nature Conservancy
127 Industrial Road, Suite D
Big Pine Key, FL 33043

Dear Ms. Lustic:

The National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries Program (ONMS) has approved the issuance of permit amendment number FKNMS-2011-150-A2 to conduct activities in Florida Keys National Marine Sanctuary (sanctuary). This amendment supersedes all previous permits or amendments for this activity. Activities are to be conducted in accordance with the permit application and all supporting materials submitted to the sanctuary, and the detailed terms and conditions of permit number FKNMS-2011-150-A2 (enclosed).

You are responsible for reviewing and understanding all terms and conditions of this amendment. However, the changes made in this amendment from the previous permit or amendment can be summarized as follows:

- The permit expiration date has been changed to June 27, 2018.
- Permitted Activity Description #1 has been updated to reflect that all nurseries are now established.
- Permitted Activity Description #3 has been updated to note that there are 35 approved outplanting locations.
- Permitted Activity Description #4 has been removed because it is no longer relevant to this project, and the remaining Descriptions renumbered accordingly.
- Permitted Activity Descriptions #4 (new) and #5 have been updated to remove reference to experimental corals.
- Permitted Activity Description #7 has been added to authorize the collection of a limited number of coral fragments of opportunity.
- Permitted Activity Description #8 has been added to authorize entrance into Looe Key Special Use (Research Only) Area.
- Permitted Activity Description #9 has been added to authorize the removal of surplus, second-generation coral fragments from the Sanctuary.
- Special Conditions #4 and 9, and Attachment B, have been removed and the remaining conditions renumbered accordingly.
- Special Condition #5 has been added to address collection of loose coral fragments.
- Special Condition #6 has been updated with corrected contact information.
- Special Condition #7 has been updated to reflect monitoring requirements.
- Special Condition #8 has been updated with a new reporting schedule.
- Special Condition #10 has been updated with the new permit number.
- Special Condition #11 has been added to address transfer of surplus coral fragments.
- Attachment A has been updated with correct coordinates for Yellow Rocks and five (5) new outplanting sites.



This permit is not valid until signed and returned to the ONMS. Retain one signed copy and carry it with you while conducting the permitted activities. Additional copies must be signed and returned, by either mail or email, to the following individuals within 30 days of issuance and before commencing any activity authorized by this permit:

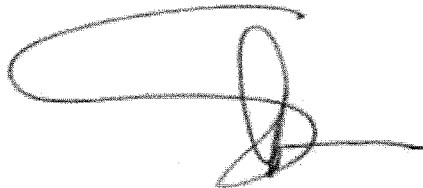
ENS Linh Nguyen
NOAA Corps Officer
Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040
Linh.Nguyen@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

Your permit contains specific terms, conditions and reporting requirements. Review them closely and fully comply with them while undertaking permitted activities.

If you have any questions, please contact Joanne Delaney at Joanne.Delaney@noaa.gov. Thank you for your continued cooperation with the ONMS.

Sincerely,

A handwritten signature in black ink, appearing to be 'Sean Morton', with a large loop at the end.

Sean Morton
Superintendent

Enclosure



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040

**FLORIDA KEYS NATIONAL MARINE SANCTUARY
PERMIT TO FURTHER NATURAL RESOURCE VALUE OF THE SANCTUARY**

Permittee:

Ms. Caitlin Lustic
The Nature Conservancy
127 Industrial Road, Suite D
Big Pine Key, FL 33043

Permit Number: FKNMS-2011-150-A1

Effective Date: June 28, 2013

Expiration Date: June 27, 2018

Project Title: Threatened Coral Recovery in Florida and the U.S. Virgin Islands

This permit is issued for activities in accordance with the National Marine Sanctuaries Act (NMSA), 16 USC §1431 *et seq.*, and regulations thereunder (15 CFR Part 922). All activities must be conducted in accordance with those regulations and law. No activity prohibited in 15 CFR Part 922 is allowed except as specified in the activity description below.

Subject to the terms and conditions of this permit, the National Oceanic and Atmospheric Administration (NOAA), Office of National Marine Sanctuaries (ONMS) hereby authorizes the permittee listed above to conduct activities within Florida Keys National Marine Sanctuary (FKNMS or sanctuary). All activities are to be conducted in accordance with this permit and the permit application received April 17, 2013. The permit application is incorporated into this permit and made a part hereof; provided, however, that if there are any conflicts between the permit application and the terms and conditions of this permit, the terms and conditions of this permit shall be controlling.

Permitted Activity Description:

The following activities are authorized by this permit:

1. Deployment of equipment and materials on the sea floor at Permitted Activity Locations #1 – 4 to support four staghorn coral (*Acropora cervicornis*) nurseries that were established under permits #FKNMS-2007-041, #FKNMS-2009-099-A1, and #FKNMS-2011-150. Equipment may include concrete blocks, pads, and disks; PVC pipe; anchors, lines, weights, and floats; markers and tags; and other materials.
2. Manipulation of *A. cervicornis* in coral nurseries at Permitted Activity Locations #1 – 4 to maintain corals and produce new fragments.
3. Relocation of *A. cervicornis* from coral nurseries (Permitted Activity Locations #1 – 4) to 35 reef sites listed in Attachment A, by attaching fragments, tags, and associated base discs, as applicable, to reef framework devoid of marine life (i.e., “dead”) using epoxy or similar materials. A maximum of 1500 *A. cervicornis* fragments may be placed at each site over the permit duration.



4. Removal of corallivorous snails and fire worms from relocated *A. cervicornis* corals (locations listed in Attachment A).
5. Manipulation of relocated *A. cervicornis* corals (locations listed Attachment A) by reattaching broken fragments, removing diseased fragments, and taking small tissue samples only as necessary for health screening.
6. Temporary deployment of equipment on the sea floor for monitoring relocated *A. cervicornis* corals and to support any of the activities listed above.
7. Hand collection of a total of 100 fragments per region of *A. cervicornis* from corals at risk of disease or destruction or from loose fragments lying on the sea floor (collectively referred to as "fragments of opportunity"), and placement of fragments within coral nurseries.
8. Entrance into the Looe Key Special Use (Research Only) Area.
9. Removal of second-generation and later *A. cervicornis* coral fragments from the Sanctuary that were produced as a result of propagation under this or previous permit(s) and that are in excess of the corals needed to fulfill restoration goals.

No further violation of sanctuary regulations is allowed.

Permitted Activity Location:

The permitted activity is allowed only in the following locations:

Coral nursery locations (all coordinates are °N latitude and °W longitude):

Location #		Corner 1		Corner 2		Corner 3		Corner 4	
1	Upper Keys	24.983000	80.437500	24.983000	80.435500	24.981000	80.437500	24.981000	80.435500
2	Middle Keys	24.668200	81.026000	24.668200	81.022600	24.665000	81.026000	24.665000	81.022600
3	Lower Keys	24.562747	81.400455	24.561453	81.400018	24.562097	81.398704	24.563383	81.399145
4	Middle Keys	24.747650	80.785575	24.747764	80.782792	24.746628	80.782700	24.746397	80.785536

Coral restoration site locations are listed in Attachment A.



Special Terms and Conditions:

1. Each *A. cervicornis* fragment must meet the following criteria prior to relocation to reef sites:
 - A. Has 5 cm or greater of linear growth,
 - B. Does not show signs of disease, injury, or active predation,
 - C. Has 100% live tissue, and,
 - D. Exhibits normal coloration.
2. All relocated *A. cervicornis* corals must not be placed on live coral or any other significant marine resource.
3. All relocated *A. cervicornis* corals must be individually identified and mapped to facilitate future monitoring.
4. Relocating *A. cervicornis* fragments to sites not listed in Attachment A requires FKNMS approval. Contact Scott Donahue (Scott.Donahue@noaa.gov), FKNMS Science Coordinator, and Joanne Delaney (Joanne.Delaney@noaa.gov), FKNMS Permit Coordinator, for assistance.
5. When multiple (>5) loose *A. cervicornis* fragments are encountered in an area, no more than 25% may be collected at one time under Permitted Activity Description #7. The number, collection location, and disposition of all fragments of opportunity (loose fragments and those trimmed from diseased colonies) shall be reported to FKNMS in the annual reports required under Special Condition #8.
6. The permittee must provide daily advance notification to Florida Fish and Wildlife Conservation Commission (FWC) Law Enforcement Dispatch and the appropriate regional sanctuary office for all permitted activities occurring within any Sanctuary Preservation Area (SPA) or Special Use (Research Only) Area. The permit number, contact person, vessel type, vessel registration number, and location of the day's activities must be reported prior to conducting activities as follows:
 - A. Notify FWC Dispatch in Marathon via email at DLESOMiamidutyofficers@myfwc.com or via fax at (305) 470-5047;
 - B. For activities in Upper Keys zones (Carysfort Reef SPA south to Tennessee Reef Research Only Area), notify Mary Tagliareni at (305) 852-7717 x30;
 - C. For activities in Lower Keys zones (Coffins Patch SPA to Tortugas Ecological Reserve), notify Scott Donahue at (305) 809-4700 x239.
7. A subset of *A. cervicornis* transplants at each receiver site shall be monitored in two intervals (e.g., one month after transplant and again approximately 3-6 months post-transplant) for survivorship, condition, bleaching, disease, predation, and breakage. This monitoring schedule shall be followed for each outplanting event. The results of these monitoring events shall be reported to FKNMS as described in Special Condition #8.



8. The permittee must submit a report annually over the duration of the permit that summarizes all coral outplanting efforts in the past year, including:
 - number of corals moved to each site,
 - origin of coral fragments,
 - map of each site,
 - number, location, and disposition of any fragments of opportunity that were collected, and,
 - results of the two required post-relocation monitoring events and any relevant observations.

The annual reports are due on the following dates:

June 28, 2014
June 28, 2015
June 28, 2016
June 28, 2017
June 28, 2018

Each report shall be submitted to Scott Donahue (Scott.Donahue@noaa.gov), FKNMS Science Coordinator, and Joanne Delaney (Joanne.Delaney@noaa.gov), FKNMS Permit Coordinator.

9. All materials deployed on the sea floor must be removed upon permit expiration by the permittee.
10. Any scientific publications and/or reports resulting from activities conducted under the authority of this permit must include the notation that the activity was conducted under permit number FKNMS-2011-150-A2. Additionally, the permittee and her respective institution(s) are required to acknowledge during any media coverage (press releases, video/photo, or other means) that research activities occurred within the FKNMS and under permit. Boilerplate language on the sanctuary is available by request; contact Karrie Carnes at Karrie.Carnes@noaa.gov.
11. The permittee or any person(s) to whom second-generation and later *A. cervicornis* coral fragments are provided under Permitted Activity Description #9 must comply with all applicable regulations on this species, including the Endangered Species Act. This permit does not satisfy obligations under any other laws, regulation or authorities.

General Terms and Conditions:

1. Within 30 (thirty) days of the date of issuance, the permittee must sign and date this permit for it to be considered valid. Once signed, the permittee must send copies, via mail or email, to the following individuals:



ENS Linh Nguyen
NOAA Corps Officer
Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040
Linh.Nguyen@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

2. It is a violation of this permit to conduct any activity authorized by this permit prior to the ONMS having received a copy signed by the permittee.
3. This permit may only be amended by the ONMS. The permittee may not change or amend any part of this permit at any time. The terms of the permit must be accepted in full, without revision; otherwise, the permittee must return the permit to the sanctuary office unsigned with a written explanation for its rejection. Amendments to this permit must be requested in the same manner the original request was made.
4. All persons participating in the permitted activity must be under the supervision of the permittee, and the permittee is responsible for any violation of this permit, the NMSA, and sanctuary regulations for activities conducted under, or in junction with, this permit. The permittee must assure that all persons performing activities under this permit are fully aware of the conditions herein.
5. This permit is non-transferable and must be carried by the permittee at all times while engaging in any activity authorized by this permit.
6. This permit may be suspended, revoked, or modified for violation of the terms and conditions of this permit, the regulations at 15 CFR Part 922, the NMSA, or for other good cause. Such action will be communicated in writing to the applicant or permittee, and will set forth the reason(s) for the action taken.
7. This permit may be suspended, revoked or modified if requirements from previous ONMS permits or authorizations issued to the permittee are not fulfilled by their due date.
8. Permit applications for any future activities in the sanctuary or any other sanctuary in the system by the permittee might not be considered until all requirements from this permit are fulfilled.
9. This permit does not authorize the conduct of any activity prohibited by 15 CFR § 922, other than those specifically described in the "Permitted Activity Description" section of this permit. If the permittee or any person acting under the permittee's supervision conducts, or causes to be conducted, any activity in the sanctuary not in accordance with the terms and conditions set forth in this permit, or who otherwise violates such terms and conditions, the permittee may be subject to civil penalties, forfeiture, costs, and all other remedies under the NMSA and its implementing regulations at 15 CFR Part 922.



10. Any publications and/or reports resulting from activities conducted under the authority of this permit must include the notation that the activity was conducted under National Marine Sanctuary Permit FKNMS-2011-150-A2 and be sent to the ONMS officials listed in general condition number 1.
11. This permit does not relieve the permittee of responsibility to comply with all other federal, state and local laws and regulations, and this permit is not valid until all other necessary permits, authorizations and approvals are obtained. Particularly, this permit does not allow disturbance of marine mammals or seabirds protected under provisions of the Endangered Species Act, Marine Mammal Protection Act, or Migratory Bird Treaty Act. Authorization for incidental or direct harassment of species protected by these acts must be secured from the U.S. Fish and Wildlife Service and/or NOAA Fisheries, depending upon the species affected.
12. The permittee shall indemnify and hold harmless the Office of National Marine Sanctuaries, NOAA, the Department of Commerce and the United States for and against any claims arising from the conduct of any permitted activities.
13. Any question of interpretation of any term or condition of this permit will be resolved by NOAA.

Your signature below, as permittee, indicates that you accept and agree to comply with all terms and conditions of this permit. This permit becomes valid when you, the permittee, countersign and date below. Please note that the expiration date on this permit is already set and will not be extended by a delay in your signing.



Ms. Caitlin Lustic
The Nature Conservancy

6-28-13

Date



Sean Morton
Superintendent
Florida Keys National Marine Sanctuary

June 28, 2013

Date

1 document attached.



ATTACHMENT A

Acropora cervicornis relocation locations (receiver sites) within FKNMS.
No more than 1500 *A. cervicornis* fragments shall be placed at each location.

<i>Coral relocation / restoration site</i>	<i>Coordinates¹</i>	<i>Protected status</i>
Key Largo Dry Rocks	N25° 07.412', W80° 17.792'	FKNMS SPA ²
Molasses Reef	N25° 00.713', W80° 22.281'	FKNMS SPA
Pickles Reef	N24° 59.152', W80° 24.880'	none
Conch Reef	N24° 57.231', W80° 27.457'	FKNMS SPA
Davis Reef	N24° 55.349', W80° 30.327'	FKNMS SPA
Staghorn Acres	N24° 37.295', W81° 07.625'	none
Delta Shoal	N24° 37.943', W81° 05.338'	none
Tropical Rocks	N24° 39.399', W81° 00.629'	None
Yellow Rocks	N24° 38.964', W81° 01.794'	none
Tennessee Reef	N24° 44.684', W80° 46.913'	none
Alligator Reef	N24° 51.779', W80° 37.339'	none
Nearshore Patch 1	N24° 41.969', W80° 58.007'	none
Nearshore Patch 2	N24° 42.709', W80° 56.757'	none
Nearshore Patch 3	N24° 43.116', W80° 55.838'	none
Coffins Patch	N24° 41.192', W80° 57.705'	FKNMS SPA
Coffins Patch 2	N24° 41.135', W80° 57.818'	FKNMS SPA
20 (offshore Coffins Patch)	N24° 40.560', W80° 57.420'	none
Marker 48	N24° 41.520', W81° 01.560'	none
Long Key Bridge Rubble	N24° 43.873', W80° 49.827'	none
11 Foot Mound	N24° 43.400', W80° 51.700'	none
East Washerwoman	N24° 39.856', W81° 04.593'	none
East of Delta	N24° 38.377', W81° 03.986'	none
Lower Keys site 1	N24° 36.909', W81° 22.750'	none
Lower Keys site 2	N24° 37.284', W81° 21.776'	none
Lower Keys site 3	N24° 34.038', W81° 27.546'	none
Lower Keys site 4	N24° 35.722', W81° 22.316'	none
Lower Keys site 5	N24° 33.784', W81° 24.060'	Looe Key NMS EMA ³
Lower Keys site 6	N24° 33.862', W81° 23.901'	Looe Key NMS EMA
Lower Keys site 7	N24° 34.161', W81° 22.901'	none
Lower Keys site 8	N24° 31.379', W81° 31.226'	none
Lower Keys site 9	N24° 31.937', W81° 28.951'	none
Lower Keys site 10	N24° 33.135', W81° 23.036'	Looe Key NMS EMA
Lower Keys site 11	N24° 33.160', W81° 22.903'	none
Lower Keys site 12	N24° 34.162', W81° 19.817'	none
Looe Key Research Only Area	N24° 34.053', W81° 23.331'	Looe Key Research Only Area

¹ Relocation site may fall within a half mile radius of this coordinate

² Sanctuary Preservation Area

³ National Marine Sanctuary Existing Management Area





Special Activity License

Florida Fish and Wildlife Conservation Commission
Division of Marine Fisheries Management
620 S. Meridian St., Mail Station 4B3, Tallahassee, Florida 32399-1600
Ph: 850-487-0554 • Fax: 850-487-4847

Issued to: Caitlin Lustic
The Nature Conservancy
P.O. Box 420237
Summerland Key, Florida 33042

License #: SAL-13-1086A-SCRP
Effective Date: 06/13/2013
Expiration Date: 04/08/2014

Authorized Activities:

- 1) Captive-reared staghorn coral (*Acropora cervicornis*) fragments and elkhorn coral (*Acropora palmata*) may be collected from the approved in-water coral nurseries and outplanted to the approved release (outplanting) locations as identified on the maps attached to this license.

Coral fragments may only be outplanted to the release locations within the same county as the in-water coral nursery from where they were collected (e.g., corals collected from an in-water coral nursery located within Broward County shall only be outplanted to the approved release locations within Broward County).

A release authorization is not required prior to outplanting coral fragments collected from the in-water coral nurseries, provided that each fragment meets the Visual Health Assessment criterion established in the attached "Release Protocol for Captive-reared Acroporid Corals."

- 2) Harvest of any species of Corals of Opportunity or COOs (unattached broken coral fragments found laying on the sea floor), and relocate/reattach COOs to substrate within the same county (including approved in-water nurseries) from where they were collected (e.g., COOs collected within Broward County shall only be reattached to substrate within Broward County including approved in-water coral nurseries within Broward County).

Additional authorization may be required for above authorized activities from the Florida Department of Environmental Protection and/or Broward or Dade Counties. Additional authorization is required to conduct any activities within Biscayne National Park or the Florida Keys National Marine Sanctuary.

Licensee Signature Caitlin Lustic Date 6-14-2013

Not valid unless signed. By signature, confirms that all information provided to issue the license is accurate and complete, and indicates acceptance and understanding of the provisions and conditions listed below. **Any false statements or misrepresentations when applying for this license may result in felony charges and will result in revocation of this license.**

Authorized by: Lisa Gregg, OMC II for: Nick Wiley, Executive Director
Authorizing Signature Lisa Gregg Date 6-13-2013

License Conditions and Provisions

Authorized Locations: State waters of Broward, Dade and Monroe Counties, with the following exceptions:

- 1) Corals may only be collected from the approved in-water nursery sites and only released (outplanted) to the approved release locations within the same county as the in-water nursery sites, identified in the attached document “Approved Nursery and Release Locations, SAL-13-1086-SCRIP”.
- 2) Corals of Opportunity (COOs) may only be collected and relocated/reattached to substrate within the same county (including in-water nurseries) and same region (e.g., upper, middle, lower Keys) from where they were collected.
- 3) This license does not authorize any activity outside of state waters.
- 4) This license does not authorize any activity within any state park, unless a research/collecting permit has been obtained from the Florida Department of Environmental Protection, Division of Recreation and Parks.
- 5) This license does not authorize any activity within any federal park, unless a federal park permit has been obtained.
- 6) This license does not authorize any activity within the Florida Keys National Marine Sanctuary (FKNMS), unless a FKNMS permit has been obtained.
- 7) This license does not authorize any activity within any Manatee Limited Entry Area (No Entry or Motorboat Prohibited Zones – list attached to this license).

Purpose: Outplanting of captive-reared marine organisms for stock restoration purposes pursuant to Rule 68B-8, F.A.C.

Law Enforcement Notification: Notification must be made to the nearest FWC Law Enforcement Dispatch Center 24 hours prior to conducting any SAL related activities. An advanced float plan detailing locations, dates, and times of activities shall constitute sufficient notice, provided that authorized personnel do not deviate from the float plan and the float plan is filed with the nearest FWC Law Enforcement Dispatch Center at least 24 hours prior to conducting SAL related activities.

Authorized Personnel: Erich Bartels, Cody Bliss, James Byrne, Nick Corby, Gabriel Delgado, Scott Donahue, Crawford Drury, David S. Gilliam, John Hauk, Jessica Hornbeck, Pam Hughes, John Hunt, Meaghan Johnson, Elizabeth A. Larson, Jessica Levy, Diego Lirman, Caitlin E. Lustic, Kerry Maxwell, Tom Moore, Sean Morton, Ken Nedimyer, Rolando Santos, Stephanie Schopmeyer, Bill Sharp, Cory Walter, Charles J. Walton, as well as members of the media operating under the direct supervision of named authorized personnel.

Authorized Gear:

- 1) Hand collection.
- 2) Hammer and nails, for attaching identification tags and/or outplant fragments to substrate*.
- 3) Marine epoxy and/or cement for attachment of fragments to substrate.
- 4) Bone cutters, wire cutters, and/or needle nose pliers.
- 5) Chisels, and chipping hammers for surface prep.
- 6) Transect lines*.
- 7) Quadrats*.
- 8) Nylon cable ties*.

*Additional permits may be required from the Florida Department of Environmental Protection, Broward or Dade County, Biscayne National Park, or the Florida Keys National Marine Sanctuary for this activity.

Captivity Requirements: All marine organisms (broodstock and captive-bred/captive-reared included) that are targeted for release must be maintained according to the following requirements:

- Treatment Chemicals – Marine organisms targeted for release may not be treated with chemicals such as malachite green, marine ich treatment chemicals, copper sulfate, antibiotics, formalin or anesthetics (MS-222, clove oil, quinaldine, etc), unless use of such chemicals is in compliance with established Food and Drug Administration (FDA) guidelines or are veterinarian-prescribed. This does not include chemicals

used to maintain water chemistry (to control pH, ammonia, or nitrite levels) and does not include vitamins or other nutritional supplements. Chemicals that are not approved by the FDA or prescribed by a veterinarian may not be used on any organisms targeted for release. Any organisms treated with veterinarian-prescribed chemicals may not be released until the withdrawal period specified by the veterinarian has expired.

Health Certification: Prior to the release (outplanting) of captive-reared coral fragments that have been maintained within the in-water coral nurseries, a visual health assessment must be conducted for each fragment following the protocols in the attached “Release Protocol for Captive-reared Acroporid Corals”. The data to be collected and reported are also specified in the attached protocol.

Release Authorization: A Release Authorization is not required prior to release (outplanting) of captive-reared coral fragments from the approved in-water coral nurseries, provided that each fragment meets the Visual Health Assessment criterion established in the attached “Release Protocol for Captive-reared Acroporid Corals.”

Monitoring: Monitoring must be conducted post-outplanting following the attached “Release Protocol for Captive-reared Acroporid Corals”. The data to be collected and reported are also specified in the attached protocol.

Prohibited Activities:

- 1) The following are considered prohibited species and may not be harvested or possessed unless authorized by a Special Activity License issued specifically for activities involving prohibited species:
 - a. Invertebrates: anemone, giant Caribbean (*Condylactis gigantea*), conch, queen (*Strombus gigas*); coral, fire (Genus *Millepora*); coral, hard and stony (Order Scleractinia); live rock (non-aquacultured); sea fan, common (*Gorgonia ventalina*); sea fan, Venus (*Gorgonia flabellum*); starfish, Bahama (*Oreaster reticulatus*); urchin, longspine (*Diadema antillarum*).
 - b. Finfishes: bonefish (Family Albulidae); grouper, Goliath (*Epinephelus itajara*); grouper, Nassau (*Epinephelus striatus*); silverside, key (*Menidia conchorum*); spearfish, longbill (*Tetrapturus pfluegeri*); spearfish, Mediterranean (*Tetrapturus belone*); spearfish, roundscale (*Tetrapturus georgei*); sturgeon (Family Acipenseridae); topminnow, saltmarsh (*Fundulus jenkinsi*).
 - c. Sharks and rays: dogfish, spiny (*Squalus acanthias*); mako, longfin (*Isurus paucus*); ray, manta (Genera *Manta* and *Mobula*); ray, spotted eagle (*Aetobatus narinari*); sand tiger (*Odontaspis taurus*); sand tiger, bigeye (*Odontaspis noronhai*); sawfish, largetooth (*Pristis pristis*); shark, Atlantic angel (*Squatina dumeril*); shark, basking (*Cetorhinus maximus*); shark, bigeye sixgill (*Hexanchus nakamurai*); shark, bigeye thresher (*Alopias vulpinus*); shark, bignose (*Carcharhinus altimus*); shark, Caribbean reef (*Carcharhinus perezii*); shark, Caribbean sharpnose (*Rhizoprionodon porosus*); shark, dusky (*Carcharhinus obscurus*); shark, Galapagos (*Carcharhinus galapagensis*); shark, great hammerhead (*Sphyrna mokarran*); shark, lemon (*Negaprion brevirostris*); shark, narrowtooth (*Carcharhinus brachyurus*); shark, night (*Carcharhinus signatus*); shark, sandbar (*Carcharhinus plumbeus*); shark, scalloped hammerhead (*Sphyrna lewini*); shark, sevengill (*Heptranchias perlo*); shark, silky (*Carcharhinus falciformis*); shark, [bluntnose] sixgill (*Hexanchus griseus*); shark, smalltail (*Carcharhinus porosus*); shark, smooth hammerhead (*Sphyrna zygaena*); shark, tiger (*Galeocerdo cuvier*); shark, whale (*Rhincodon typus*); shark, white (*Carcharodon carcharias*).
- 2) Special Activity Licenses do not authorize any collection of marine mammals or marine turtles. The collection of any other marine organism identified as a Florida Endangered and Threatened Species will be permitted pursuant to the provisions of Chapters 68A-27 and 68B-8, F.A.C.
- 3) Marine organisms harvested pursuant to a SAL may not be sold or consumed unless specified otherwise on this license.
- 4) Third party contractors are limited to conditions specified on the SAL while performing activities requiring the license. No other harvesting activity (recreational or commercial) may be simultaneously conducted while performing activities pursuant to a SAL unless specified otherwise on the license. Please note that any specimens held by a third party contractor awaiting shipment, in quarantine, or at any

location other than the facility a SAL is directly issued to, will not be covered by the SAL if it expires and the third party contractor is still holding the specimens at their facility. Shipment of the specimens must be completed prior to the expiration date of the SAL.

General License Conditions:

- 1) Any authorized personnel conducting activities pursuant to a Special Activity License (SAL) must have a copy of the license signed by both the Commission and the licenseholder, complete with all attachments as specified on the license, in his/her possession while conducting any activities requiring the SAL.
- 2) Special Activity Licenses may be suspended or revoked if authorized personnel listed on the permit have violated FWC rules or policies, terms or conditions of the license, or have submitted false or inaccurate information on their application.
- 3) Special Activity Licenses are non-transferable.

Possession after SAL Expiration: The Commission recognizes that a marine organism collected pursuant to a SAL may need to be retained for a period of time that extends beyond the expiration date of the SAL issued for its harvest. For this purpose, the following conditions must be met for marine organisms collected pursuant to a SAL to be legally possessed beyond the expiration of a SAL:

- 1) All documentation required for reporting must be submitted to the Commission within 30 days of expiration of the SAL.
- 2) Following the expiration date of the SAL, the original SAL or a copy is sufficient documentation to authorize possession of a marine organism harvested pursuant to a SAL. Such documentation must be promptly produced at the request of an authorized law enforcement officer.

Transferability of Marine Organisms: A SAL is not required if a marine organism harvested pursuant to a SAL is being moved through formal transfer or loan between facilities that meet the eligibility requirements in 68B-8.003(1), F.A.C., and are certified aquaculture facilities or are conducting scientific research, education, or exhibition activities. A marine organism authorized for sale under 68B-8.003(11) is not considered a transfer or loan. In lieu of a SAL, documentation must be permanently maintained by a facility that possesses a marine organism harvested pursuant to a SAL and transferred or loaned to that facility. The documentation must include the following:

- 1) A copy of the SAL authorizing the harvest of the marine organism.
- 2) The chain of possession from initial harvest to current possession.
- 3) If the transfer or loan involves a certified aquaculture facility, a copy of the aquaculture facility's valid certification.
- 4) A detailed description of each marine organism being transferred or loaned including common name, scientific name, size, and sex.
- 5) Number of each type of marine organism being transferred or loaned.
- 6) Date of transfer, or beginning and ending date of loan.
- 7) Name, address, and contact person for the transferring facility and for the receiving facility.
- 8) Signatures from representatives of the transferring and receiving facilities acknowledging that the transfer was completed or the loan was initiated.

Reporting Requirements: A Stock Collection and Release SAL holder must submit the following documentation to fulfill reporting requirements:

- 1) Data collection/reporting requirements as specified in the attached "Release Protocol for Captive-reared Acroporid Corals" must be submitted within 30 days of expiration of this license.
- 2) A copy of any publications, technical, monitoring, or final reports that were generated as a result of work conducted pursuant to the SAL. These reports must include the notation that research was conducted pursuant to the specific Commission Special Activity License.

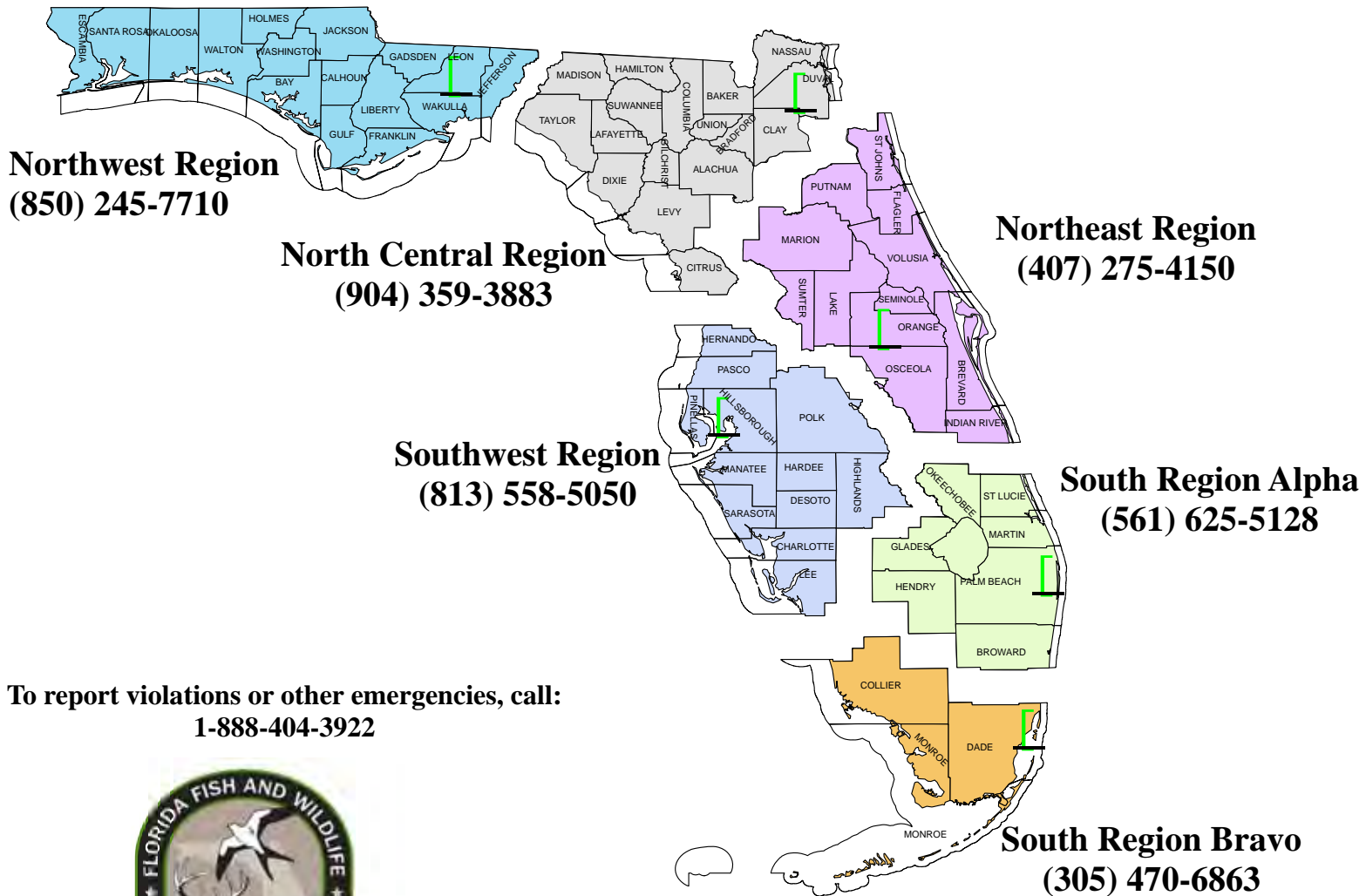
Attachments to Follow:

- FWC Division of Law Enforcement, Special Activity License Notification Locations & Numbers
- Approved Nursery and Outplant Locations, SAL-13-1086-SCRP (6 maps)

- Release Protocol for Captive-reared Acroporid Corals
- Manatee Limited Entry Areas

A person whose substantial interests are affected by FWC's action may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. A person seeking a hearing on FWC's action shall file a petition for hearing with the agency within 21 days of receipt of written notice of the decision. The petition must contain the information and otherwise comply with section 120.569, Florida Statutes, and the uniform rules of the Florida Division of Administration, chapter 28-106, Florida Administrative Code. Upon such notification, the Licensee shall cease all work authorized by this license until the petition is resolved. The enclosed Explanation of Rights statement provides additional information as to the rights of parties whose substantial interests are or may be affected by this action.

FWC Division of Law Enforcement Regional Communication Center Contact Information



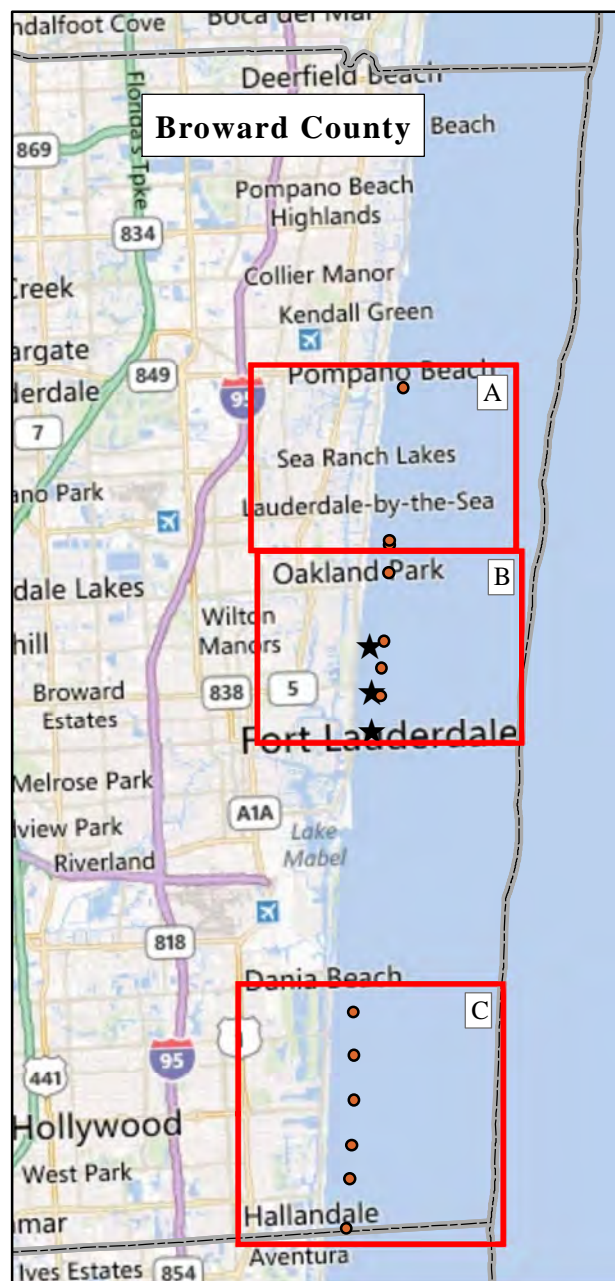
The numbers listed are manned 24 hours daily.
If SAL holders need to provide information via fax, please request the fax number from dispatcher.



0 50 100 200 Miles

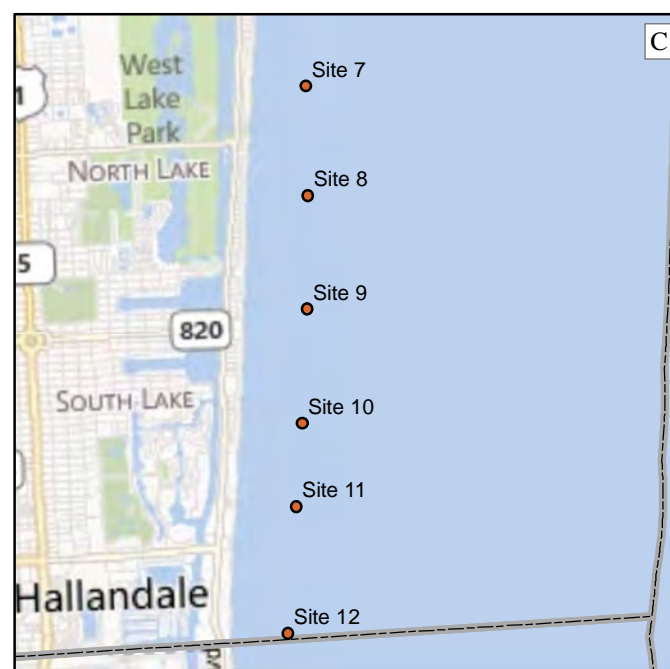
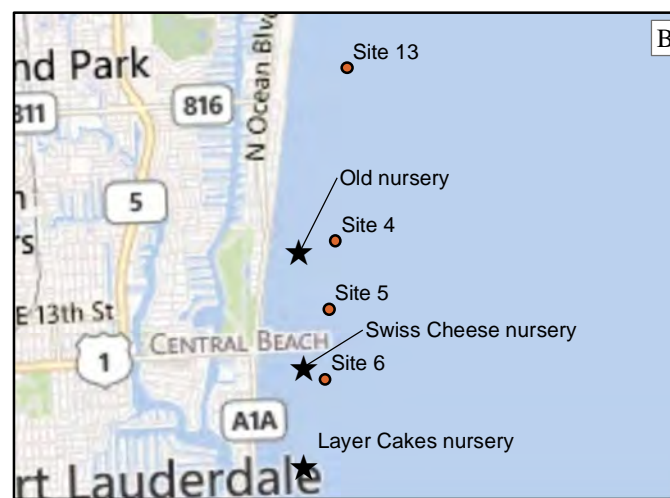
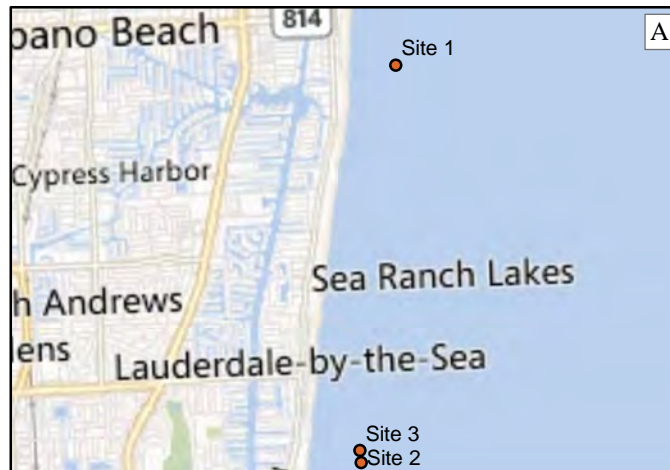
The holder of a SAL must notify the nearest Commission Law Enforcement Dispatch Center not later than 24 hours prior to conducting activities under a SAL. Notification may consist of a float plan detailing locations, dates, and times of activities. Deviations from the float plan are permitted only after 24-hour advance notification to the nearest Commission Law Enforcement Dispatch Center. Float plans are valid for the duration of the SAL unless rescinded by the SAL holder.

Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Broward County



Approved Sites*

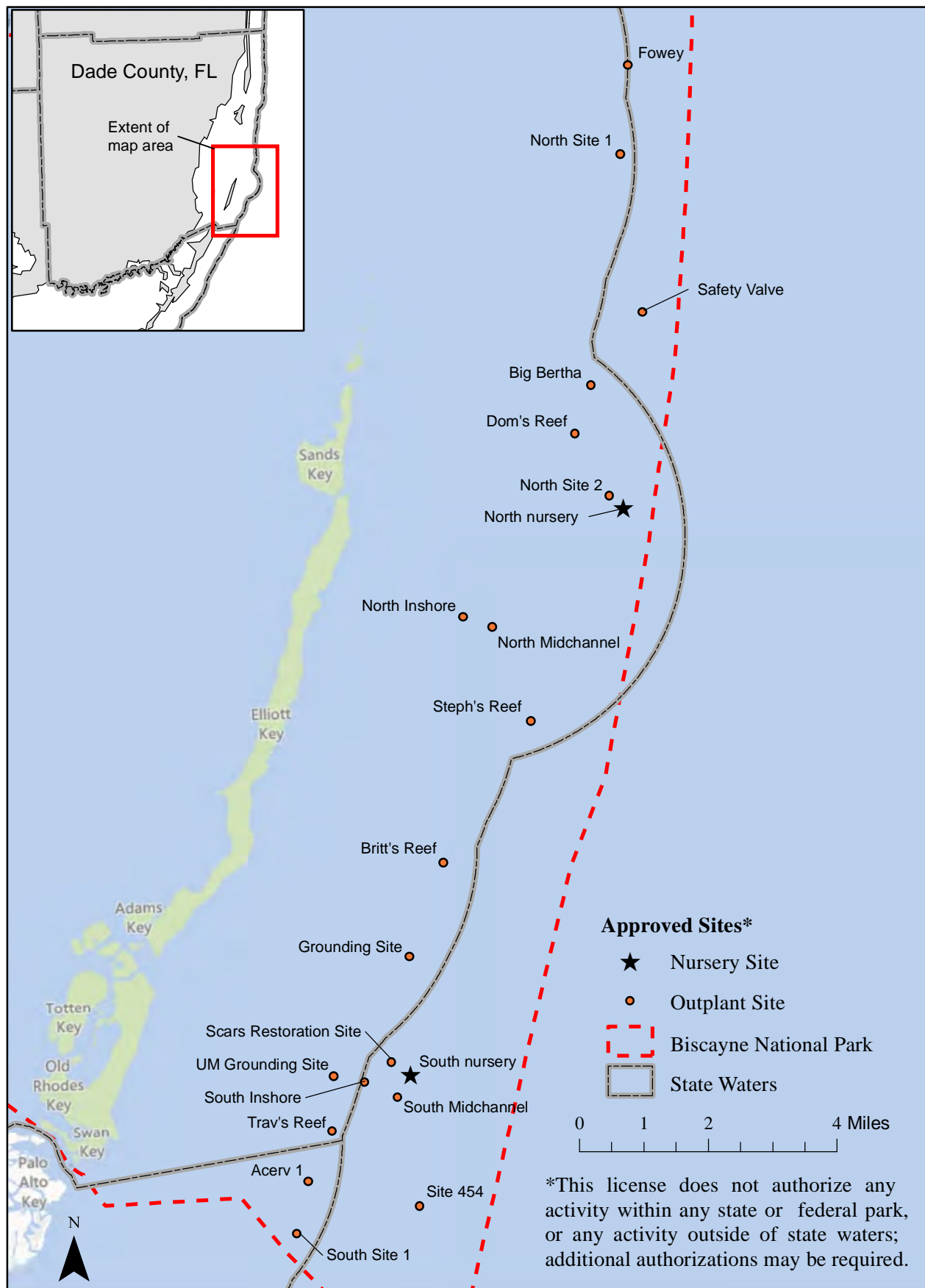
- ★ Nursery Site
- Outplant Site
- County Boundaries



0 1 2 4 Miles

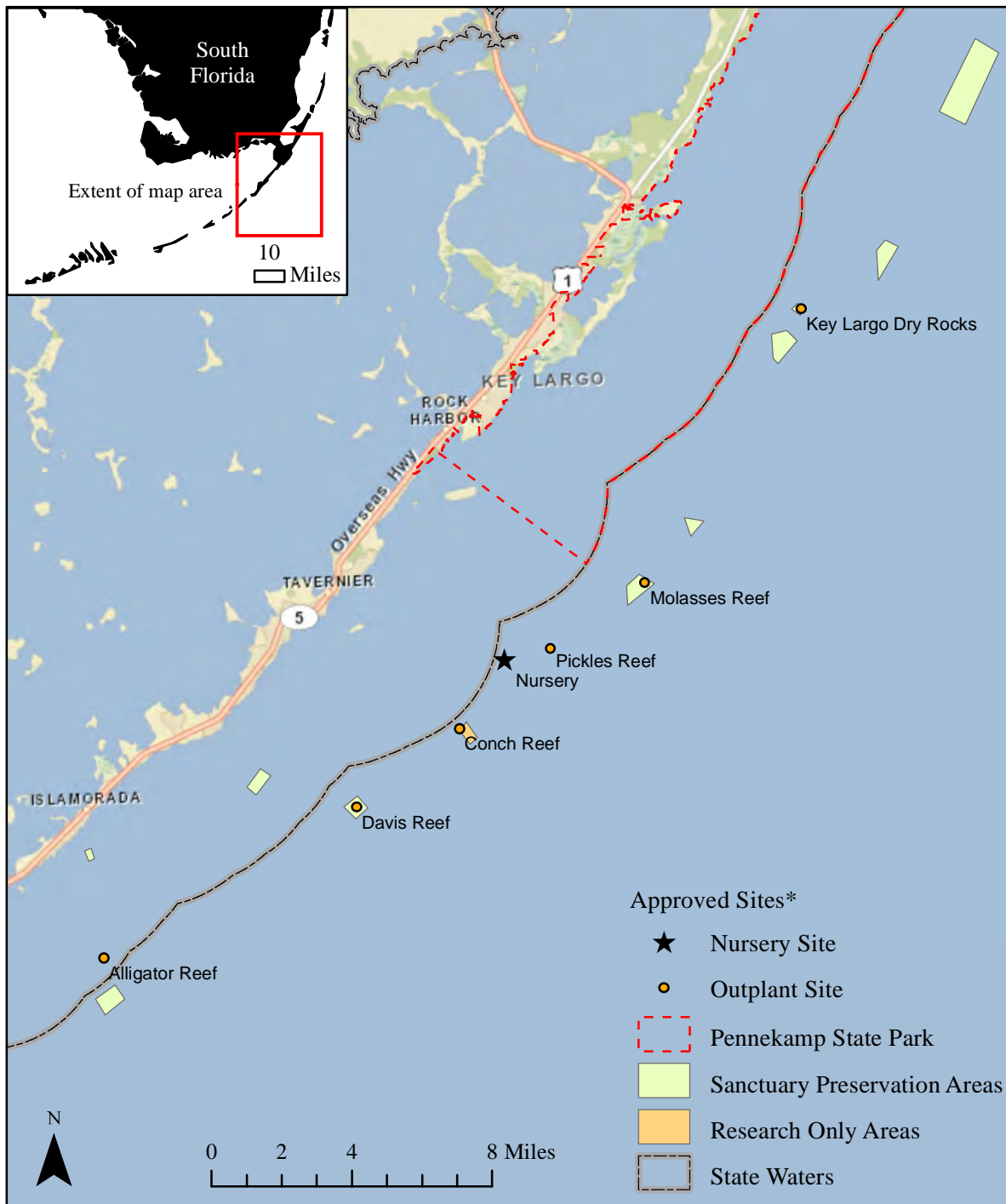
* This license does not authorize any activity within any state or federal park or any activity outside of state waters; additional authorizations may be required.

Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Dade County



Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Upper Keys



*This license does not authorize any activity within John Pennekamp Coral Reef State Park, or within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

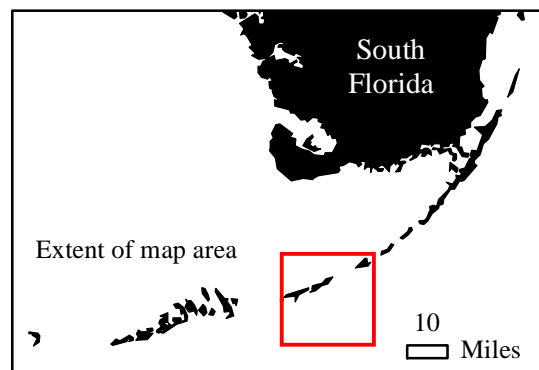
Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Middle Keys



Approved Sites*

- ★ Nursery Site
- Outplant Site
- Sanctuary Preservation Areas
- Research Only Areas
- State Waters



*This license does not authorize any activity within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

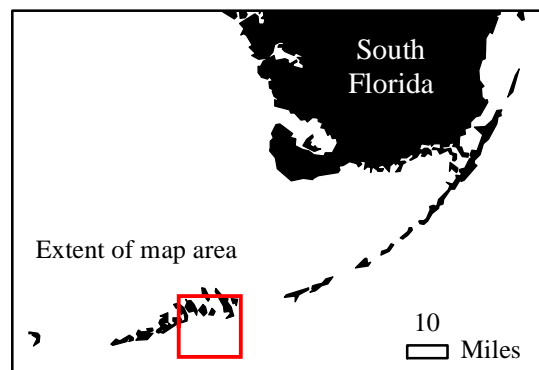
Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Lower Keys



Approved Sites*

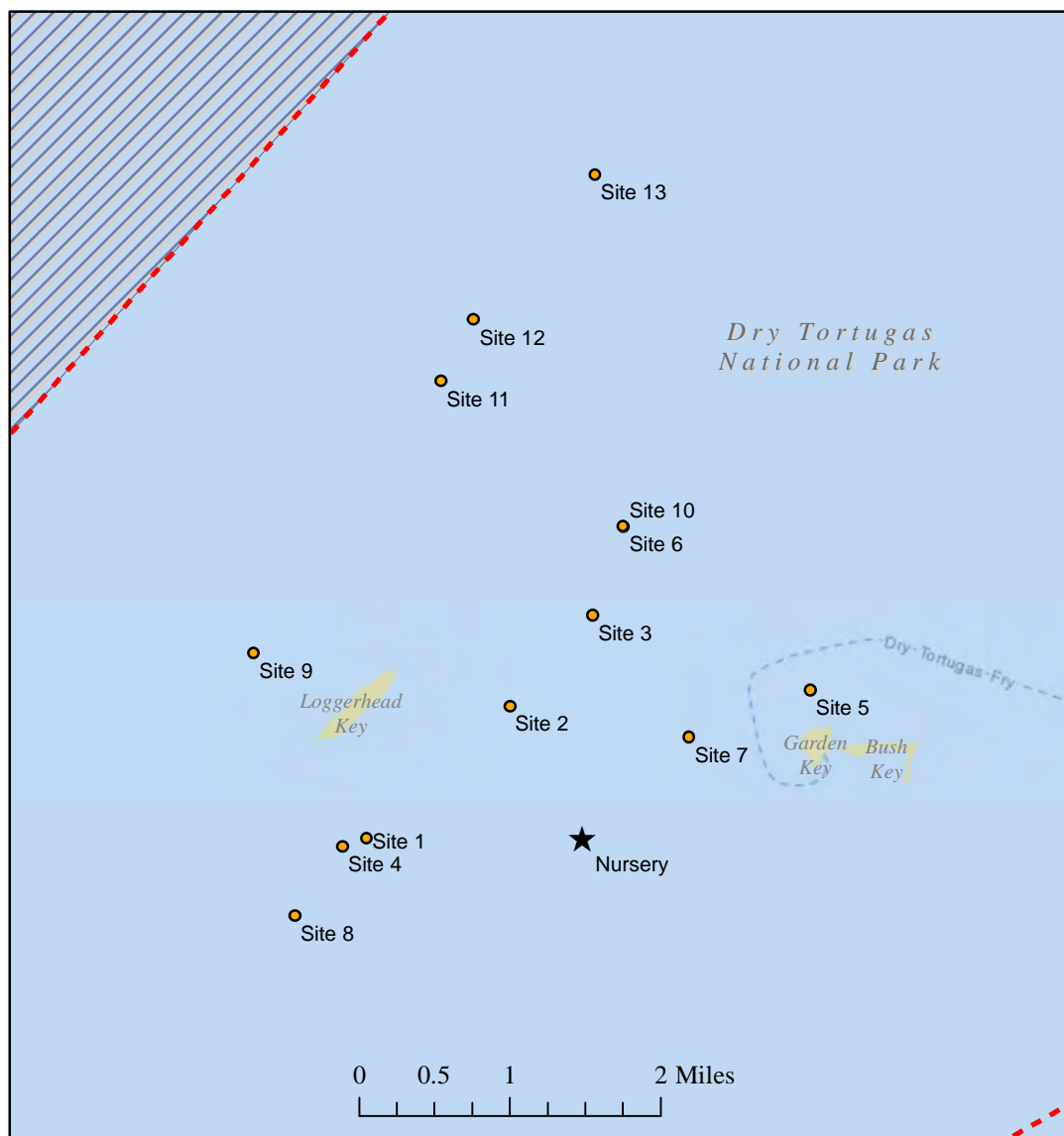
- ★ Nursery Site
- Outplant Site
- Sanctuary Preservation Areas
- Research Only Areas
- State Waters






*This license does not authorize any activity within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

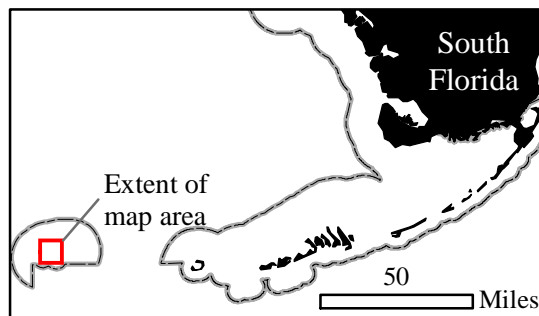
Approved Nursery and Outplant Locations, SAL-13-1086-SCRP Monroe County

Dry Tortugas



Approved Sites*

- ★ Nursery Site
- Outplant Site
-  Ecological Reserves
-  Dry Tortugas National Park
-  State Waters



*This license does not authorize any activity within Dry Tortugas National Park, or within Ecological Reserves, Sanctuary Preservation Areas, or Special-use Areas of the Florida Keys National Marine Sanctuary, unless additional authorizations have also been obtained.

Release Protocol for Captive-reared Acroporid Corals

Release Site Selection

Selection of appropriate release sites should meet the following general guidelines:

- 1) Suitable reef habitat and/or historic presence of the species (in recent decades)
- 2) Healthy environment for the given region
- 3) Not within any permitted marine and coastal construction areas (i.e. dredging, beach nourishment projects, etc.), or military exclusion areas.

Definitions

For purposes of this protocol:

- 1) A “donor colony” is defined as any wild coral colony (including super-colony) from which a clipping is harvested for subsequent culture activities.
- 2) A “broodstock fragment” is defined as a coral clipping harvested from a wild donor colony.
- 3) A “nursery colony” is defined as a coral colony that has been reared and raised in the nursery.
- 4) An “outplant fragment/colony” is a fragment from a nursery colony or an entire nursery colony removed from the nursery.

Visual Health Assessment

Each outplant fragment or colony must be visually evaluated prior to outplant to ensure that they appear to be in good health and are free from suspected disease. Each outplant fragment or colony must meet the following criterion prior to outplanting:

- 1) Staghorn coral (*Acropora cervicornis*) fragments must have at least 5 cm (approx. 2”) of linear growth; elkhorn coral fragments must be at least 5 cm (approx. 2”) in diameter.
- 2) Show no visible signs of disease, injury, or active predation based on the presence of:
 - a. Bleaching and/or paling of tissue or other discoloration.
 - b. Recent mortality (denuded skeleton to development of fine “fuzz” on branches indicating mortality within a couple of weeks prior to observation).
 - c. Bearded fireworm, *Hermodice carunculata* or the gastropod *Coralliophila abbreviata* in feeding positions (at tissue loss margin).
 - d. Microbial mat (e.g., black band cyanobacteria and other organisms at tissue loss margin).
 - e. Growth anomalies (altered morphology of tissue and skeleton).

Data Collection

The following data must be recorded prior to outplanting for each nursery genotype represented, and must be reported to the FWC upon expiration of the license:

- 1) Name of original collector.
- 2) Species name.
- 3) Date of collection.
- 4) Original donor colony location information (GPS coordinates, water depth).
- 5) Original donor colony ID number.
- 6) Location of nursery (GPS coordinates, water depth)

The following data must be recorded prior to outplanting for each outplant fragment or colony, and must be reported to the FWC upon expiration of the license:

- 1) Documented verification that suspected disease(s) and active predation was assessed and NOT observed for the outplant fragment or colony, based on the Visual Health Assessment criterion above.
- 2) Fragment or colony ID number.
- 3) Fragment or colony genotype
- 4) Fragment or colony size, in one of the following size classes, defined by total linear extension – 5- 10 cm, 11 – 50 cm, 51 – 100 cm, 101 – 200 cm, anything larger than 201 cm will be estimated to the nearest 100 cm.

Release Protocol for Captive-reared Acroporid Corals

- 5) Representative photos of outplanted corals, including photos of individuals and the landscape, will be taken at each outplant site.
- 6) It is recommended that a comment section be provided on the data collection sheet in the event that the collector wishes to provide any additional information they may deem to be relevant (i.e. water visibility, etc.) at the time of release.

Monitoring Requirements

- 1) Data Collection. The following data must be collected for a representative subset of fragments (defined by 5 outplant fragments or colonies per genotype at each outplant site) at one month and between three and 6 months after release and must be reported to the FWC upon expiration of the license:
 - a. Name of monitoring personnel.
 - b. Species name.
 - c. Date of monitoring event.
 - d. Site name (GPS coordinates).
 - e. Fragment ID number.
 - f. Documented verification that suspected disease(s) and active predation was assessed for the fragment, based on the Visual Health Assessment criterion above.
- 2) Diseased fragments. At each monitoring event, the representative subset of outplant fragments or colonies (see above) will be assessed for disease. If ten or more of these fragments or colonies are identified to be diseased, all of the fragments or colonies at that site will be assessed for disease. Visual health assessment should follow criteria above. A representative set of disease samples shall be preserved for health screening according to the Fixation/Handling of Coral Samples protocol below. If less than ten of these fragments or colonies are identified to be diseased, then this should be noted as part of the monitoring data collected.

Fixation/Handling of Coral Samples

As soon as possible fix the sample(s) using the following fixative ratios:

Ideally a 20:1 (fixative to tissue volume) will be used. At a minimum a 10:1 (fixative to tissue volume) can be used.

- Standard fixative is 5% PFMA (Paraformaldehyde) in 0.1M Phosphate Buffer, pH 7.4.
- 10% formalin (prepared from 37% Formaldehyde) in 0.1M Phosphate Buffer, pH 7.4 may also be used.
- 10% Neutral Buffered Formalin purchased from outside vendors is acceptable.
- 10% seawater formalin (prepared from 37% formaldehyde)

Fix tissue samples on ice or in the refrigerator, as lower temperatures delay autolysis during penetration of the fixative.

Use a sample jar (preferably plastic for ease of shipping and handling) large enough to accommodate the volume of fixative required for the size of the sample. Retain sample until arrangements can be made to ship to a diagnostic laboratory for health screening (TBD).

If immediate fixation is not possible, pack the samples thoroughly and completely **IN ICE (not touching – preferably in plastic bags)** to minimize postmortem changes.


FWC will provide materials for fixation of diseased coral samples.

Notification Requirement

Notification must be made to the FWC if any significant (i.e. ten or more fragments or colonies are identified to be diseased) outbreak is observed at outplant sites. This notification should be in the form of an email to Kerry Maxwell (Kerry.Maxwell@MyFWC.com) with a subject that reads “TNC Outplant Disease Observation”. Kerry Maxwell will arrange transfer of the diseased coral samples to the FWC.

FWC MANATEE PROTECTION NO ENTRY AND MOTORBOATS PROHIBITED ZONES IN EFFECT AS OF OCT. 2009

<i><u>County</u></i>	<i><u>Restriction and Location</u></i>	<i><u>Citation in Fla. Admin. Code</u></i>
Brevard County	<u>No Entry Zones (November 15 – March 31)</u>	
	Reliant (formerly OUC) Power Plant (Indian River)	68C-22.006(2)(a)1., FAC
	FPL Power Plant (Indian River)	68C-22.006(2)(a)2., FAC
	<u>Motorboats Prohibited Zone (Year-round)</u>	
	C-54 Canal (off the Sebastian River)	68C-22.006(2)(b)2., FAC
Broward County	<u>Motorboats Prohibited Zone (November 15 – March 31)</u>	
	Reliant (formerly OUC) Power Plant (Indian River)	68C-22.006(2)(b)1., FAC
	<u>No Entry Zones (Year-round)</u>	
	FPL Port Everglades Power Plant	68C-22.010(1)(a)1., FAC
	FPL Lauderdale Power Plant	68C-22.010(1)(a)2., FAC
Citrus County	<u>No Entry Zones (November 15 – March 31)</u>	
	Blue Waters area of the Homosassa River (2 zones)	68C-22.011(1)(m), FAC
Collier County	<u>No Entry Zone (Year-round)</u>	
	Basin off of Henderson Creek	68C-22.023(1)(a), FAC
Dade County	<u>No Entry Zones (Year-round)</u>	
	Virginia Key Area	68C-22.025(1)(e)1., FAC
	Black Creek Canal	68C-22.025(1)(e)2., FAC
	<u>No Entry Zones (November 15 - April 30)</u>	
	Biscayne Canal	68C-22.025(1)(f)1., FAC
	Little River	68C-22.025(1)(f)2., FAC
	Coral Gables Canal	68C-22.025(1)(f)3., FAC
	<u>Motorboats Prohibited Zone (Year-round)</u>	
	Fisher Island Area	68C-22.025(1)(d), FAC
Hillsborough County	<u>No Entry Zone (November 15 - March 31)</u>	
	TECO-Big Bend Power Plant	68C-22.013(2)(a), FAC
Indian River County	<u>No Entry Zone (November 15 – March 31)</u>	
	Vero Beach Power Plant	68C-22.007(1)(e), FAC
Lee County	<u>No Entry Zone (November 15 – March 31)</u>	
	FPL Tice Power Plant (Orange River)	68C-22.005(2)(a), FAC
Palm Beach County	<u>Motorboats Prohibited Zone (November 15 - March 31)</u>	
	FPL Riviera Beach Power Plant	68C-22.009(1)(e), FAC
Sarasota County	<u>No Entry Zone (Year-round)</u>	
	Pansy Bayou	68C-22.026(2)(c), FAC
	<u>No Entry Zone (November 15 – March 15)</u>	
	Warm Mineral Springs / Salt Creek	68C-22.026(3)(b), FAC
St. Lucie County	<u>No Entry Zone (Year-round)</u>	
	Harbor Branch Canal Basin	68C-22.008(2)(a), FAC
	<u>Motorboats Prohibited Zone (November 15 - March 31)</u>	
	Moore's Creek	68C-22.008(2)(b), FAC
Volusia County	<u>Motorboats Prohibited Zone (October 15 - April 15)</u>	
	Blue Spring	68C-22.012(2)(d), FAC

<p align="center">SCIENTIFIC RESEARCH AND COLLECTING PERMIT</p> <p align="center">Grants permission in accordance with the attached general and special conditions</p> <p align="center"> United States Department of the Interior National Park Service</p> <p align="center">Dry Tortugas NP</p>	<p>Study#: DRTO-00075</p> <p>Permit#: DRTO-2013-SCI-0002</p> <p>Start Date: Mar 01, 2013</p> <p>Expiration Date: Mar 01, 2014</p> <p>Coop Agreement#: n/a</p> <p>Optional Park Code: DRTO-285 (Accession #)</p>
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<p>Name of principal investigator:</p> <p>Name: Meaghan Johnson Phone: 305-872-7071 Email: meaghan_johnson@tnc.org</p>
<p>Name of institution represented:</p> <p>The Nature Conservancy</p>
<p>Co-Investigators:</p> <p>Name: See attached special conditions. Phone: n/a Email: n/a</p>
<p>Project title:</p> <p>Staghorn Coral (<i>Acropora cervicornis</i>) Restoration in Dry Tortugas National Park</p>
<p>Purpose of study:</p> <p>Healthy coral reefs provide coastal protection, are high centers of biodiversity, and support a wide range of recreational and commercially important species of fish and invertebrates. Significant declines in living coral coverage within The Dry Tortugas National Park (and worldwide) have occurred in recent decades due to local, regional, and global threats. In particular, populations of the important reef building branching staghorn coral, <i>Acropora cervicornis</i>, have declined 80-90% throughout the Caribbean and western Atlantic since the late 1980s. In May 2006, both elkhorn and staghorn corals were listed as threatened species under the U.S. Endangered Species Act. To enhance recovery of staghorn coral, we initiated a Staghorn Restoration Project which focused on restoring degraded reefs along the Florida Reef Tract (Broward, Miami-Biscayne, Upper Keys and Lower Keys). Four coral nurseries were established and currently hold >4,000 coral fragments of this fast growing threatened coral species. Over 400 nursery-reared coral colonies have already been transplanted successfully to 15 restoration sites. This project allowed for comparisons between genotypic fitness in staghorn coral across most of the reef tract as a possible factor contributing to the overall resilience of these systems. Due to the success of these projects and need for enhanced recovery of the species, we now propose to expand this project into The Dry Tortugas National Park. This project will allow the evaluation of sub-regional and sub-zonal variation in survivorship and growth, and establish a solid underlying basis for where large-scale restoration within the reef tract will provide the greatest returns.</p>
<p>Subject/Discipline:</p> <p>Coastal / Marine Systems</p>
<p>Locations authorized:</p> <p>See attached special conditions.</p>
<p>Transportation method to research site(s):</p> <p>See attached special conditions.</p>
<p>Collection of the following specimens or materials, quantities, and any limitations on collecting:</p> <p>See attached special conditions.</p>
<p>Name of repository for specimens or sample materials if applicable:</p> <p>n/a</p>
<p>Specific conditions or restrictions (also see attached conditions):</p> <p>See attached special conditions.</p>

Recommended by park staff(name and title):

Tanya A. Ziegler Fisheries Biologist

Approved by park official:

[Signature]

Title:

Science Coordinator

Reviewed by Collections Manager:

Yes ☒ No ☐

Date Approved:

2/13/13

I Agree To All Conditions And Restrictions Of this Permit As Specified
(Not valid unless signed and dated by the principal investigator)

[Signature]
(Principal investigator's signature)

2/26/13
(Date)

**THIS PERMIT AND ATTACHED CONDITIONS AND RESTRICTIONS MUST BE CARRIED AT ALL TIMES
WHILE CONDUCTING RESEARCH ACTIVITIES IN THE DESIGNATED PARK(S)**

Deliverable Due Dates for Permit DRTO-2013-SCI-0002

1. The permittee must submit an IAR to the NPS Natural Resources Informations Division each calendar year by March 31st.
2. The permittee must submit a Comprehesive annual report (hardcopy and electronic copy), electronic copy of data, and photocopy of field notes on 09/01/14
3. If the permittee needs to renew permit DRTO-2013-SCI-0002 by 03/02/14, a permit renewal application must be submitted by 12/02/13.
4. Please see special condition 14 for submitting deliverables.

DRY TORTUGAS NATIONAL PARK COLLECTING PERMIT

Special Conditions or Restrictions

Permit No. DRTO-2013-SCI-0002

for

Meaghan Johnson

The Nature Conservancy

1. No federal T&E (threatened or endangered) species may be collected. Accidental deaths, injury, or collection of T&E or any species not included in this permit must be documented and the staff of the SFNRC (South Florida Natural Resources Center) of Dry Tortugas National Park (DRTO) must be informed of their occurrence immediately, no later than 48 hours after the event. **Failure to do so will result in criminal prosecution. In the case of T&E species, the permittee must cease all sampling activities while the SFNRC re-evaluates the techniques used. In either case, pending the results of the circumstances, the NPS (National Park Service) may suspend all activities or modify the permit.** The SFNRC reserves the right to ensure compliance with unannounced visits from any NPS staff member or their designee. Records, facilities, storage, procedures and methodology, personnel, and samples are subject to inspection.
2. The permittee is liable to perform the duties as described in the permit or as limited by any conditions set forth in this permit. Any deviations must be submitted in writing prior to conductance of such activities. The conductance of such additional activities cannot begin until the permittee has an amended permit authorizing the additional activities.

All wildlife species must be monitored and/or taken in a humane manner. Should DRTO determine monitoring and/or collection practices are inhumane, such activities will immediately cease and collection will not resume until an acceptable method has been determined by DRTO and the permittee has been issued an amended permit citing changes to the monitoring and/or collection method. Any inhumane taking will subject the permittee to the penalties of the act, including revocation of this permit.

3. **Only persons identified in this research permit are permitted to perform tasks associated with this permit.** The permittee is responsible for the actions of any individual operating under the authority of the holder's permit. Additional persons must be screened carefully by the permittee to ensure compliance. Names added to the permit at a later time must be given to SFNRC before they participate in any activities.

4. Study specific conditions:

The permittee may monitor the condition of coral fragments (*Acropora cervicornis* and *Acropora prolifera*) that were relocated to a nursery established in December 2010 at the following coordinates (see attached map):

Nursery 1 24.61951 -82.8978

Once coral fragments have reached a minimum size of 3cm, the permittee may clip and relocate those fragments to one of the following proposed outplanting sites (see attached map):

Outplanting 1	24.619	-82.897
Outplanting 2	24.632	-82.905
Outplanting 3	24.641	-82.896

Outplanting 4	24.619	-82.92
Outplanting 5	24.634	-82.874
Outplanting 6	24.65	-82.893
Outplanting 7	24.629	-82.886
Outplanting 8	24.612	-82.928
Outplanting 9	24.638	-82.932
Outplanting 10	24.65	-82.893
Outplanting 11	24.662	-82.912
Outplanting 12	24.669	-82.908
Outplanting 13	24.684	-82.896

A total of 4 outplanting sites are expected to be selected/created from these 13 locations. Once outplanting sites have been established, the permittee will provide their exact coordinates to the Research Permit Coordinator.

Corals may be outplanted using one of the following methods:

- 1) On a cement puck or disk that is securely fastened to the substrate. If the coral was grown on a line nursery, it will be transferred to a puck in the nursery prior to outplanting to allow it to acclimate.
- 2) Securely fastened to a nail that is driven into the substrate.
- 3) Securely fastened directly to the substrate.

When conducting research in the Park, cultural resources such as archeological sites, shipwrecks, human remains and/or other artifact features may be encountered. These resources are protected by laws and policies including the Antiquities Act and the Archeological Resources Protection Act. **If cultural resources are encountered, they should be reported immediately to the Chief of Cultural Resources.** A scientific research permit does not allow for the documentation or excavation of an archeological site, which requires an Archeological Research Protection Act Permit issued by the Regional Archeologist. As these sites can be vulnerable to looting and vandalism, disclosure of site locations is prohibited by law. Permit holders are responsible for all cooperators, support staff and contractors working pursuant to the terms of the contract. If there are any questions, **Chief of Cultural Resources can be contacted at 305-242-7755.**

The permittee must report any lionfish observations in Dry Tortugas National Park to tracy_ziegler@nps.gov. The report for each observation should include the number of lionfish, estimated size (length) of each lionfish; the location, including GPS coordinates; and a brief microhabitat description, including depth (e.g., under a rock ledge at deep edge of a pinnacle reef, depth 58 ft [17.5m]).

Prior to start of operations at Dry Tortugas National Park, the permittee must contact the Dry Tortugas Chief of Operations Office, Law Enforcement Desk (305-224-4255), to discuss planned activities at DRTO.

The permittee must deploy a dive flag when conducting dive and snorkel operations.

Access on or within 100 feet of Bush and Long Keys is prohibited (see attached map).

Access on or within 100 feet of East, Middle, and Hospital Keys is prohibited.

Prior to mooring buoys being installed and for research purposes only, boats can only be anchored on sandy-bottomed substrates while working within the boundaries of Dry Tortugas National Park, especially while within the RNA. Anchoring on coral rubble, sea grass, etc. is prohibited.

The permittee cannot enter or pass through the Coral Special Protection Zone near Garden Key. The Coral Special Protection Zone is defined by the following coordinates (see attached map):

CSPZ1: N24 37.253 W82 52.293

CSPZ4: N24 37.374 W82 51.985

CSPZ5: N24 37.201 W82 51.849

CSPZ8: N24 37.073 W82 52.129

Access to the Shark Special Protection Zone is prohibited from June through October. The permittee cannot enter or pass through the Shark Special Protection Zone near Garden Key during these months (see attached map).

No vessels are permitted in the designated snorkel/swim areas (see attached map). Boats must be anchored in sand bottom outside the snorkel/swim areas; anchored boats are not allowed to drift into the swim areas.

Nighttime sampling activities are prohibited. From sunset to sunrise, all vessels must be anchored within 1 nautical mile of Garden Key.

Only field personnel listed on this permit can participate in field activities.

Each person will be responsible for having a copy of the permit on his/her person while engaged in research in the park. Everyone working under this permit should carry a photo I.D.

The permittee will provide the Research Permit Coordinator with a list of all materials/specimens/samples consumed through analysis and collection site coordinates (GPS UTM coordinates) of all materials/specimens consumed through analysis.

Data analysis for materials/specimens, consumed through analysis, must be reported in a comprehensive annual report to Dry Tortugas National Park (see special condition 14 of this permit – submit comprehensive annual report to Research Permit Coordinator).

Copies of all information collected from this research (field notes, electronic copy of data collected, maps, videotapes, photography, reports, etc.) must be accessioned into the National Park Service SFCMC collection.

Reviews for permit renewals take a minimum of 60 workdays. If the permittee wants permit DRTO-2013-SCI-0002 renewed by 03/02/14, a permit renewal application must be submitted by 12/02/13.

See NPS website for additional information pertaining to DRTO Research Permits (www.sfnrc.ever.nps.gov , click on permits).

Dive operation requirements:

If SCUBA diving operations will be performed, the permittee must ensure certain requirements are met depending upon the type of dive operation. There are two types of dive operations in the park, "reciprocity operations," and "independent operations." Reciprocity operations utilize **any** NPS dive resource, such as tanks, air fills, personnel, NPS dive gear, diving platforms, etc. In contrast, independent operations are fully autonomous of NPS resources (*i.e.*, liveaboard vessel with no DRTO divers, tanks, or gear).

For both types of dive operations: Please notify the DRTO park dive officer (PDO), Kayla_Nimmo@nps.gov, about the intended activities at least 30-days prior to the start of diving. Please include a general dive plan (approximate number of dives, depth, and times), as well as to the requirements for your operation type listed below.

In addition, dive logs need to be kept for all dives within the park and submitted to Kayla_Nimmo@nps.gov no later than November 1st of any calendar year. Dive logs must include site name and/or coordinates, diver name, buddy name, depth, and time.

For reciprocity operations: The permittee must submit a letter of reciprocity (LOR) to the Park Dive Officer (PDO), Kayla_Nimmo@nps.gov, for each reciprocity diver at least 30-days prior to the intended diving activity. New LORs must be submitted annually or anytime a change in the diver's status occurs (*i.e.*, break registration or employment, outdated refresher, new medical exam, expired certification, etc.). LORs for NOAA divers must be submitted more frequently than once a year. **Please submit all LORs in a single e-mail at least two weeks in advance of dive operations.**

When notifying the PDO with the intent to dive, please indicate what NPS resources (*i.e.*, boats, divers, approximate number of tank fills, etc.) will be needed. Reciprocity divers will follow DRTO's safe practices manual (SPM) and emergency operations plan (EOP). The DRTO PDO will submit these documents to the visiting researcher's Dive Safety Officer (DSO) upon notification of intent to dive. The permittee is responsible for distributing the DRTO EOP and SPM to all divers intending to dive in the park.

For independent operations: Divers diving independently of park dive resources will follow their own EOP and SPM. Permittee's and DSOs wishing to review the DRTO EOP and SPM for reference in development of their own, may request a copy of these documents from the DRTO PDO, Kayla_Nimmo@nps.gov when notifying the DRTO PDO with the intent to dive. Divers must follow an EOP that is appropriate to the remoteness of DRTO. Please submit these documents in a single e-mail to the DRTO PDO, Kayla_Nimmo@nps.gov.

Upon arrival at the park, please review your EOP with DRTO law enforcement staff to ensure the proper pathways are followed in an emergency. LORs do not need to be submitted for independent divers.

Curatorial responsibilities:

The permittee **must** contact the South Florida Collection Management Center (SFCMC) Museum Curator (Nancy Russell – 305-242-7826 or 305-242-7812) to obtain an accession number (required for the collection of all materials/specimens, whether kept as voucher specimens or destroyed through analysis).

No materials/specimens can be collected, until an accession number has been issued by the SFCMC Museum Curator.

All voucher specimens (including materials/specimens kept for identification purposes) remain the property of the National Park Service, and must be accessioned into the South Florida Collection Management Center (SFCMC) at Everglades National Park.

All specimens must be returned to the SFCMC; they should not be sent directly to other repositories. SFCMC staff will send the specimens and loan forms to the requested repositories.

Prior to collecting voucher specimens in the park, the permittee must contact the SFCMC Museum Curator, to discuss repository for voucher specimens, discuss anticipated curation costs, and cataloging of specimens into the NPS Automated National Catalog System (ANCS+).

The permittee must request a NPS catalog number, from the Museum Curator, for every specimen collected that will be kept as a voucher specimen.

The permittee will not request NPS catalog numbers for specimens that will be consumed through analysis.

Park accession numbers must appear on all reports and field notes.

All voucher materials/specimens sent to the South Florida Collection Management Center (SFCMC) must be accompanied with field notes; GPS coordinates of collection sites, other collection site observations, etc.

The permittee will comply with all policies stated in the South Florida Collection Management Center (SFCMC) *Curatorial Responsibilities* document (provided to the permittee when the SFCMC accession number is assigned).

5. Communications:

Prior to **every** field trip at Dry Tortugas National Park, the permittee shall notify the **Evergladed National Park (ENP) Communications Center (305-242-7740)** and the District Ranger(s), or their designee, for the area(s) research activities will take place; Pine Island District Ranger, Al Mercado (305-242-7786); Gulf Coast District Ranger, Tom landimario (941-695-4217); Flamingo District Ranger, Tony Terry (239-695-3862 or tony_terry@nps.gov); Tamiami District Ranger, Cindy Morris (305-223-2927); **Dry Tortugas Chief of Operations Office, Law Enforcement Desk (305-224-4255), Chief David Fuellner (or david_fuellner@nps.gov)** and Florida Bay District Ranger, Dave Fowler (305-852-0305). District locations may be verified with the Communications Center.

Communications Procedures:

Prior to **every** field trip into Dry Tortugas National Park, the permittee **must** contact, **by phone (not radio)**, the Everglades National Park Communications Center to advise dispatchers of the permittee's monitoring/collection plans. The permittee **must** provide the dispatcher with the permittee's permit number, departure point, destination, mode of transportation, number of people in the field party, names of field staff, and the estimated time of return to the departure point. Upon completion of work and return to

the departure point, the permittee **must** contact the Communications Center, by phone, to advise them that the days field operations are finished. *(ENP Communications Center must be contacted at the beginning of each field day and at the end of each field day).*

Note: Park radio traffic should be kept to a minimum. If the permittee must use a park radio for communications with other members of his/her field party, the permittee must make sure that all radios are on the local park channel (channel 1). All other channels energize park radio repeaters thereby transmitting messages park wide.

Prior to **every** field trip into Dry Tortugas National Park, the appropriate District Ranger and/or Ranger staffs **must** be notified of all field monitoring/collection activities and **must** be notified upon completion of field activities *(District Rangers/Ranger Staffs must be contacted at the beginning of each field day and at the end of each field day).*

If the permittee cannot establish contact with the Communications Center and District Rangers(s)/Ranger Staff(s) field operations cannot take place.

When conducting field activities, within Dry Tortugas National Park, the permittee must carry a radio or cell-phone for emergency purposes. All emergencies should be immediately reported to the Communications Center (305-242-7740). Permittees with access to park radios can contact the Communications Center on channel 2. The Communications Center call sign is KIE 784. Permittees should use "624 and their last name" for identifying themselves to the Communications Center.

6. **The permittee is required to have a clearly visible and legible copy of this permit in any vehicle left on the side of the road or in a closed area for which the permittee has authorization to enter (the permit must be displayed on the dashboard of the vehicle).** Unauthorized parking is subject to towing at the owner's expense.
7. Disturbing submerged natural features, such as seagrass; disturbing historic artifacts or features; or violating any other regulations while engaging in activities associated with this permit may result in criminal prosecution as well as administrative sanction. The permittee must comply with all posted signs.
8. Work in areas where visitors are present shall be avoided. All structures and materials placed in the field must be clearly marked with the permittee's name, institution, and study number. These items must be removed at the end of each project.
9. The permittee, in exercising the privileges granted by this permit, shall comply with the regulations of the Department of the Interior's National Park Service, and all federal, state, county and municipal laws, ordinances, or regulations which are applicable to the area of operations covered by this permit.
10. With the exception of those motorized equipment activities listed in section four (Study Specific Conditions), this permit does not authorize use of motorized equipment in designated wilderness areas where motorized equipment is prohibited.
11. **A valid copy of this permit, and all additional state or federal permits, shall be in the permittee's possession at all times while collecting or monitoring.** A permit is valid only if it has all the attachments originally sent and the dates are still current.
12. All specimens are the property of the United States Government. Final deposition must be reported in full, on an annual basis, to the permit coordinator and the park museum

curator (See section 6 of the NPS General Conditions for Research Permits).

13. Permittees conducting motorboat and airboat operations in the park must insure that boats have appropriate safety gear on board at all times (lifejackets, fire extinguishers, paddles, sounding devices, first aid kit, etc.) Boats must meet State, Federal, and USCG standards. DRTO cooperators using DRTO boats must have required safety gear, as specified in the DRTO airboat and motorboat manuals. The permittee should also carry provisions (water, food, etc.), in case of an emergency that results in an extended stay in the field.
14. **This permit expires 01 Mar 2014.** It is the permittee's responsibility to renew their permit if desired. Please note that normally a minimum of 60-workdays are needed for permit reviews and processing requirements. DRTO will not send notice that the permit has expired.

Reviews for permit renewals take a minimum of 60 workdays. If the permittee wants permit DRTO-2013-SCI-0002 renewed by 03/02/14, a permit renewal application must be submitted by 12/02/13.

Permit renewals will only be considered if the permittee submits an application and a research proposal. The research proposal must indicate any changes to the original proposal (changes in scope of work, personnel, sampling locations, etc.).

The permittee **must** apply for permit renewal and submit an electronic version of their proposal (must be Microsoft Word format), via the National Park Service Research Permit and Reporting System, at <http://science.nature.nps.gov/research>.

Once, per calendar year, the permittee **must** submit to the National Park Service Natural Resources Information Division (NPS-NRID) an **Investigator's Annual Report (IAR)**. The IAR must be submitted via the National Park Service Research Permit and Reporting System, at <http://science.nature.nps.gov/research> (The IAR is used by the National Park Service Natural Resources Information Division to maintain a history of research accomplishments, track current research projects, and track the amount of money spent on research throughout the national parks). **The permittee will be notified by the National Park Service Natural Resources Information Division (NPS-NRID) or the ENP/DRTO permit coordinator as to when an IAR must be submitted. IARs are normally due on the last day of March of each calendar year.**

A **comprehensive annual report** (both electronic copy and hardcopy) **must** be submitted, to the ENP/DRTO research permit coordinator, **no later than six months** after the permit expires (see comprehensive annual report due dates below). The comprehensive annual report should have an introduction, description of methods, results (provide data analysis, graphs, charts, figures, etc.), discussion of results, information on the location of sampling sites (GPS coordinates), a conclusion, provide information on species and quantities of specimens collected, and include all other ancillary data.

At this time the permittee must also submit all other obligatory deliverables (ex. voucher specimens, maps, photos, copies of field notes, electronic copy of data, etc.).

Deliverables for permit DRTO-2013-SCI-0002, comprehensive annual report, data, and field notes are due on the following date:

09/01/14

(Note: The IAR submitted to the NPS-NRID will not be accepted as a substitute for the comprehensive annual report that the permittee must submit to the ENP/DRT0 research permit coordinator).

At the conclusion of the last year of the study, the permittee **must** submit to the permit coordinator, a final report (hardcopy and electronic copy using MicroSoft Word format) encompassing all work performed under the study (to include photocopies of field notes, electronic copy of data, voucher specimens, maps, photos, etc.), instead of submitting an annual report. **The final report is due six months from the expiration of the permit.**

Comprehensive annual reports or final reports should be mailed to the following address (send both hardcopy and electronic copy):

Dry Tortugas National Park
Attn: Research Permit Coordinator
40001 State Road 9336
Homestead, Fl. 33034-6733

Failure to submit annual reports or other deliverables will be justification for denying issuance of any other collection permits to the person or the institution the person represents and revocation of current permits.

15. A copy of all other reports and publications resulting from this permit must be sent to:

Dry Tortugas National Park, South Florida Natural Resources Center
ATTN: Permit Coordinator
40001 State Road 9336
Homestead, Florida 33034-6733.

Please include your permit number, DRT0-2013-SCI-0002 on all correspondence.

16. This permit will allow the permittee access to the park free of charge, when shown at the park entrance station.
17. Personnel:

The following persons are authorized to conduct research under **Permit # DRT0-2013-SCI-0002** under permittee Meaghan Johnson:

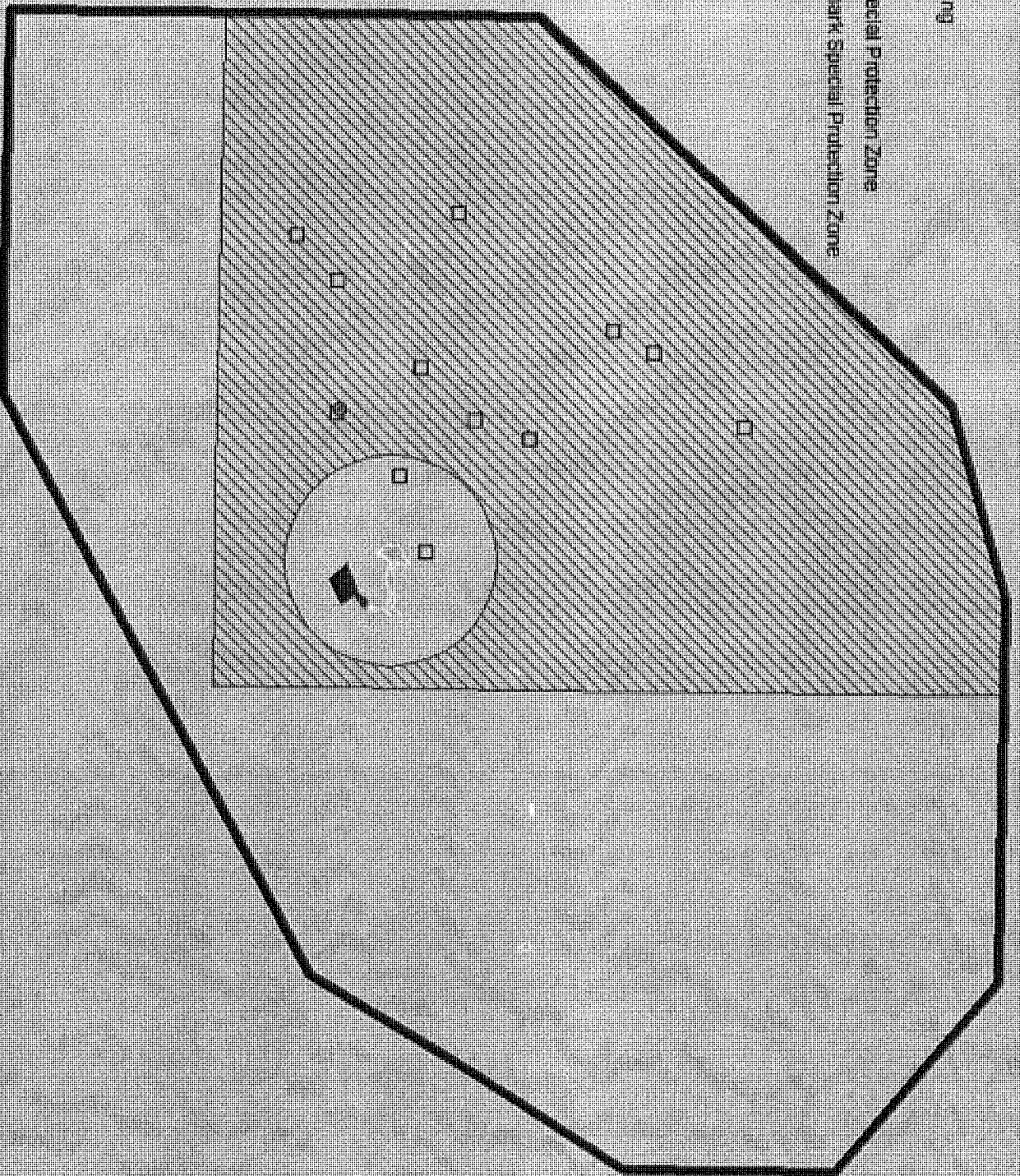
Stephanie Schopmeyer
Cory Walter
Caitlin Lustic

Liz Larson
James Byrne

Activities will be limited to the fulfillment of conditions as delineated by the permit. The permittee assumes responsibility for the actions of all additional personnel.

Legend

- Nursery
- Outplanting
- ▨ RNA
- Coral Special Protection Zone
- Nurse Shark Special Protection Zone



Loggerhead Key Snorkel/Swim and Boat Beach Landing Areas



© 2006 Earthstar Technologies
Image © 2006 NASA

Image © 2006 The Florida Department of Environmental Protection
Scale: 1:100,000
Projection: UTM
Datum: NAD 83
Units: Feet

Google

Eye alt 3154 ft



GENERAL CONDITIONS For SCIENTIFIC RESEARCH AND COLLECTING PERMIT

United States Department of the Interior
National Park Service

1. **Authority** - The permittee is granted privileges covered under this permit subject to the supervision of the superintendent or a designee, and shall comply with all applicable laws and regulations of the National Park System area and other federal and state laws. A National Park Service (NPS) representative may accompany the permittee in the field to ensure compliance with regulations.
2. **Responsibility** - The permittee is responsible for ensuring that all persons working on the project adhere to permit conditions and applicable NPS regulations.
3. **False information** - The permittee is prohibited from giving false information that is used to issue this permit. To do so will be considered a breach of conditions and be grounds for revocation of this permit and other applicable penalties.
4. **Assignment** - This permit may not be transferred or assigned. Additional investigators and field assistants are to be coordinated by the person(s) named in the permit and should carry a copy of the permit while they are working in the park. The principal investigator shall notify the park's Research and Collecting Permit Office when there are desired changes in the approved study protocols or methods, changes in the affiliation or status of the principal investigator, or modification of the name of any project member.
5. **Revocation** - This permit may be terminated for breach of any condition. The permittee may consult with the appropriate NPS Regional Science Advisor to clarify issues resulting in a revoked permit and the potential for reinstatement by the park superintendent or a designee.
6. **Collection of specimens (including materials)** - No specimens (including materials) may be collected unless authorized on the Scientific Research and Collecting permit.

The general conditions for specimen collections are:

- Collection of archeological materials without a valid Federal Archeology Permit is prohibited.
- Collection of federally listed threatened or endangered species without a valid U.S. Fish and Wildlife Service endangered species permit is prohibited.
- Collection methods shall not attract undue attention or cause unapproved damage, depletion, or disturbance to the environment and other park resources, such as historic sites.
- New specimens must be reported to the NPS annually or more frequently if required by the park issuing the permit. Minimum information for annual reporting includes specimen classification, number of specimens collected, location collected, specimen status (e.g., herbarium sheet, preserved in alcohol/formalin, tanned and mounted, dried and boxed, etc.), and current location.

- Collected specimens that are not consumed in analysis or discarded after scientific analysis remain federal property. The NPS reserves the right to designate the repositories of all specimens removed from the park and to approve or restrict reassignment of specimens from one repository to another. Because specimens are Federal property, they shall not be destroyed or discarded without prior NPS authorization.
- Each specimen (or groups of specimens labeled as a group) that is retained permanently must bear NPS labels and must be accessioned and cataloged in the NPS National Catalog. Unless exempted by additional park-specific stipulations, the permittee will complete the labels and catalog records and will provide accession information. It is the permittee's responsibility to contact the park for cataloging instructions and specimen labels as well as instructions on repository designation for the specimens.
- Collected specimens may be used for scientific or educational purposes only, and shall be dedicated to public benefit and be accessible to the public in accordance with NPS policies and procedures.
- Any specimens collected under this permit, any components of any specimens (including but not limited to natural organisms, enzymes or other bioactive molecules, genetic materials, or seeds), and research results derived from collected specimens are to be used for scientific or educational purposes only, and may not be used for commercial or other revenue-generating purposes unless the permittee has entered into a Cooperative Research And Development Agreement (CRADA) or other approved benefit-sharing agreement with the NPS. The sale of collected research specimens or other unauthorized transfers to third parties is prohibited. Furthermore, if the permittee sells or otherwise transfers collected specimens, any components thereof, or any products or research results developed from such specimens or their components without a CRADA or other approved benefit-sharing agreement with NPS, permittee will pay the NPS a royalty rate of twenty percent (20%) of gross revenue from such sales or other revenues. In addition to such royalty, the NPS may seek other damages to which the NPS may be entitled including but not limited to injunctive relief against the permittee.

7. Reports - The permittee is required to submit an Investigator's Annual Report and copies of final reports, publications, and other materials resulting from the study. Instructions for how and when to submit an annual report will be provided by NPS staff. Park research coordinators will analyze study proposals to determine whether copies of field notes, databases, maps, photos, and/or other materials may also be requested. The permittee is responsible for the content of reports and data provided to the National Park Service.

8. Confidentiality - The permittee agrees to keep the specific location of sensitive park resources confidential. Sensitive resources include threatened species, endangered species, and rare species, archeological sites, caves, fossil sites, minerals, commercially valuable resources, and sacred ceremonial sites.

9. Methods of travel - Travel within the park is restricted to only those methods that are available to the general public unless otherwise specified in additional stipulations associated with this permit.

10. Other permits - The permittee must obtain all other required permit(s) to conduct the specified project.

11. Insurance - If liability insurance is required by the NPS for this project, then documentation must be provided that it has been obtained and is current in all respects before this permit is considered valid.

12. Mechanized equipment - No use of mechanized equipment in designated, proposed, or potential wilderness areas is allowed unless authorized by the superintendent or a designee in additional specific conditions associated with this permit.

13. NPS participation - The permittee should not anticipate assistance from the NPS unless specific arrangements are made and documented in either an additional stipulation attached to this permit or in other separate written agreements.

14. Permanent markers and field equipment - The permittee is required to remove all markers or equipment from the field after the completion of the study or prior to the expiration date of this permit. The superintendent or a designee may modify this requirement through additional park specific conditions that may be attached to this permit. Additional conditions regarding the positioning and identification of markers and field equipment may be issued by staff at individual parks.

15. Access to park and restricted areas - Approval for any activity is contingent on the park being open and staffed for required operations. No entry into restricted areas is allowed unless authorized in additional park specific stipulations attached to this permit.

16. Notification - The permittee is required to contact the park's Research and Collecting Permit Office (or other offices if indicated in the stipulations associated with this permit) prior to initiating any fieldwork authorized by this permit. Ideally this contact should occur at least one week prior to the initial visit to the park.

17. Expiration date - Permits expire on the date listed. Nothing in this permit shall be construed as granting any exclusive research privileges or automatic right to continue, extend, or renew this or any other line of research under new permit(s).

18. Other stipulations - This permit includes by reference all stipulations listed in the application materials or in additional attachments to this permit provided by the superintendent or a designee. Breach of any of the terms of this permit will be grounds for revocation of this permit and denial of future permits.

Appendix 5. Negotiated Indirect Cost Recovery Agreements



United States Department of the Interior

NATIONAL BUSINESS CENTER

Indirect Cost Services

2180 Harvard Street, Suite 430

Sacramento, CA 95815



August 29, 2012

Mr. Steve C. Howell
Chief Financial & Administrative Officer
The Nature Conservancy
4245 N. Fairfax Drive, Suite 100
Arlington, Virginia 22203-1606

Dear Mr. Howell:

Enclosed is an original copy of the Indirect Cost Negotiation Agreement for the 12-month periods ending June 30, 2011 and 2013, between the Federal Government and the Nature Conservancy.

Please visit our Web site at <http://www.aqd.nbc.gov/ics> for guidance and updates on submitting indirect cost proposals. In addition, you will find helpful tools such as a completeness checklist, indirect cost and lobbying certificates, sample proposals, Excel worksheet templates, and important links to other Web sites.

Sincerely,


Deborah A. Moberly
Indirect Cost Coordinator

Enclosure

cc: Ramon E. Santos, Contract Specialist, US Agency for International Development

Ref: J:Nonprofit/Nacoh629/Issue.ltr

We want to hear from you! Please let us know how we are doing in meeting your needs by taking a short survey at: <http://www.aqd.nbc.gov/survey>.

Phone: (916) 566-7111
Fax: (916) 566-7110



E-mail: ICS@nbc.gov
Internet: <http://www.aqd.nbc.gov/ics>

**Nonprofit Organization
Indirect Cost Negotiation Agreement**

EIN: 53-0242652

Organization:

The Nature Conservancy
4245 N. Fairfax Drive, Suite 100
Arlington, Virginia 22203-1606

Date: August 29, 2012

Report No(s) .: 12-A-0922 (11F)
12-A-0923 (13P)

Filing Ref.:

Last Negotiation Agreement
dated June 16, 2011

The indirect cost rates contained herein are for use on grants, contracts, and other agreements with the Federal Government to which 2 CFR 230 (OMB Circular A-122) applies, subject to the limitations in Section II.A. of this agreement. The rates are negotiated by the U.S. Department of the Interior, National Business Center, and the subject organization in accordance with the authority contained in 2 CFR 230.

Section I: Rates

Type	Effective Period		Rate	Locations	Applicable To
	From	To			
Fixed Carryforward	07/01/12	06/30/13	18.00% 1/	All	All Programs
Fringe Benefit Rates					
Final	07/01/10	06/30/11	42.00% 2/	All	Regular Salaries
Final	07/01/10	06/30/11	12.00% 3/	All	Short-Term Salaries
Final	07/01/10	06/30/11	12.00% 4/	All	Foreign Salaries
Provisional	07/01/12	06/30/13	42.00% 2/	All	Regular Salaries
Provisional	07/01/12	06/30/13	12.00% 3/	All	Short-Term Salaries
Provisional	07/01/12	06/30/13	12.00% 4/	All	Foreign Salaries

1/ **Base:** Total direct costs, less external transfers, the value of land sold or donated to government agencies and other conservation organizations. Equipment costs valued between \$5,000 and \$50,000 are included in the base limited to the first year of capitalization. **All subawards, regardless of dollar amounts, are included in the base.**

2/ **Base:** Total salaries and wages for regular employees.

3/ **Base:** Total salaries and wages for short-term employees.

4/ **Base:** Total salaries and wages for foreign employees.

Note: The foreign fringes rate is applicable to benefits that are paid centrally by TNC's headquarters. Additional benefits are paid locally by TNC's foreign locations which are charged directly to government awards.

Treatment of fringe benefits: Fringe benefits applicable to direct salaries and wages are treated as direct costs; fringe benefits applicable to indirect salaries and wages are treated as indirect costs.

Treatment of paid absences: (a) For employees paid on TNC's U.S. payroll, the costs of vacation, holiday and sick leave pay are included in the organization's fringe benefit rate and are not included in the direct cost of salaries and wages. Claims for direct salaries and wages must exclude those amounts paid or accrued to employees for periods when they are on vacation, holiday or sick leave. Other paid absences are billed directly. (b) For employees paid on local payrolls in other country programs, paid absences are billed directly.

Section II: General

A. Limitations: Use of the rates contained in this agreement is subject to any applicable statutory limitations. Acceptance of the rates agreed to herein is predicated upon these conditions: (1) no costs other than those incurred by the subject organization were included in its indirect cost rate proposal, (2) all such costs are the legal obligations of the grantee/contractor, (3) similar types of costs have been accorded consistent treatment, and (4) the same costs that have been treated as indirect costs have not been claimed as direct costs (for example, supplies can be charged directly to a program or activity as long as these costs are not part of the supply costs included in the indirect cost pool for central administration).

B. Audit: All costs (direct and indirect, federal and non-federal) are subject to audit. Adjustments to amounts resulting from audit of the cost allocation plan or indirect cost rate proposal upon which the negotiation of this agreement was based will be compensated for in a subsequent negotiation.

C. Changes: The rates contained in this agreement are based on the organizational structure and the accounting system in effect at the time the proposal was submitted. Changes in organizational structure, or changes in the method of accounting for costs which affect the amount of reimbursement resulting from use of the rates in this agreement, require the prior approval of the responsible negotiation agency. Failure to obtain such approval may result in subsequent audit disallowance.

D. Fixed Carryforward Rate: The fixed carryforward rate is based on an estimate of the costs that will be incurred during the period for which the rate applies. When the actual costs for such periods have been determined, an adjustment will be made to the rate for future periods, if necessary, to compensate for the difference between the costs used to establish the fixed rate and the actual costs.

E. Provisional/Final Rates: Within 6 months after year end, a final rate must be submitted based on actual costs. Billings and charges to contracts and grants must be adjusted if the final rate varies from the provisional rate. If the final rate is greater than the provisional rate and there are no funds available to cover the additional indirect costs, the organization may not recover all indirect costs. Conversely, if the final rate is less than the provisional rate, the organization will be required to pay back the difference to the funding agency.

F. Agency Notification: Copies of this document may be provided to other federal offices as a means of notifying them of the agreement contained herein.

G. Record Keeping: Organizations must maintain accounting records that demonstrate that each type of cost has been treated consistently either as a direct cost or an indirect cost. Records pertaining to the costs of program administration, such as salaries, travel, and related costs, should be kept on an annual basis.

H. Reimbursement Ceilings: Grantee/contractor program agreements providing for ceilings on indirect cost rates or reimbursement amounts are subject to the ceilings stipulated in the contract or grant agreements. If the ceiling rate is higher than the negotiated rate in Section I of this agreement, the negotiated rate will be used to determine the maximum allowable indirect cost.

I. Use of Other Rates: If any federal programs are reimbursing indirect costs to this grantee/contractor by a measure other than the approved rates in this agreement, the grantee/contractor should credit such costs to the affected programs, and the approved rate should be used to identify the maximum amount of indirect cost allocable to these programs.

J. Central Service Costs: Where central service costs are estimated for the calculation of indirect cost rates, adjustments will be made to reflect the difference between provisional and final amounts.

K. Other:

1. The purpose of an indirect cost rate is to facilitate the allocation and billing of indirect costs. Approval of the indirect cost rate does not mean that an organization can recover more than the actual costs of a particular program or activity.


2. Programs received or initiated by the organization subsequent to the negotiation of this agreement are subject to the approved indirect cost rate if the programs receive administrative support from the indirect cost pool. It should be noted that this could result in an adjustment to a future rate.

3. New indirect cost proposals are necessary to obtain approved indirect cost rates for future fiscal or calendar years. The proposals are due in our office 6 months prior to the beginning of the year to which the proposed rates will apply.

Section III: Acceptance

Listed below are the signatures of acceptance for this agreement:

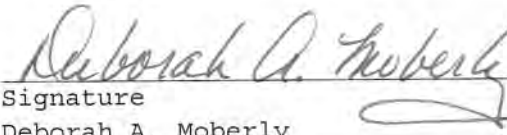
By the Nonprofit Organization:

 /s/
Signature
Stephen C. Howell
Name (Type or Print)

Chief Financial & Administrative officer
Title

August 27, 2012
Date

By the Cognizant Federal Government
Agency:

 /s/
Signature
Deborah A. Moberly
Name

Indirect Cost Coordinator

Indirect Cost Services

Title

U.S. Department of the Interior

National Business Center

Agency

Date

AUG 29 2012

Negotiated by Elena Chan

Telephone (916) 566-7102



UNITED STATES DEPARTMENT OF COMMERCE
Chief Financial Officer and
Assistant Secretary for Administration
Washington, D.C. 20230

January 25, 2010

Ms. Dena J. Smith
CFO, VP Administration
Mote Marine Laboratory, Inc.
1600 Ken Thompson Parkway
Sarasota, Florida 34236

Re: Indirect Cost Rate Proposal

Dear Ms. Smith:

After taking into consideration that the period for fiscal year 2009 has passed, DOC is issuing this letter to notify you that we will not be certifying a rate for that period. You are instructed to continue recovering indirect costs on your federal awards as you have to this point, reconciling to actual indirect costs incurred and including applicable carry-forward adjustments into your next annually scheduled rate submission package. For your reference, I have attached several pages of reference materials applicable to all subsequent rate submissions to DOC. Your organization's next indirect cost rate proposal submission should cover the period January 1, 2010 - December 31, 2010 and be based on audited financial statements for your fiscal year ending December 31, 2009.

If you have any questions, please feel free to contact Greg Coss of my staff at (202) 482-3134 or email gcoss1@doc.gov.

Sincerely,

A handwritten signature in blue ink, which appears to read "Gary W. Johnson", is written over a large, stylized blue circular mark.

Gary W. Johnson
Director, Grants Management Division
Office of Acquisition Management

Enclosures



UNITED STATES DEPARTMENT OF COMMERCE
Chief Financial Officer
Assistant Secretary for Administration
Washington, D.C. 20230

September 29, 2008

Ms. Dena J. Smith, CFO, VP Administration
Mote Marine Laboratory, Inc.
1600 Ken Thompson Parkway
Sarasota, Florida 34236

Reference: Indirect Cost Negotiation Agreement

Dear Ms. Smith:

Based on the Department's review, we are approving the requested indirect cost rate for the year ended December 31, 2007. The resultant rate subject to this agreement must be used for billing under grants, contracts and cooperative agreements during the fiscal year ending December 31, 2008; and was computed based on the audited financial statements of the entity, for the year ended December 31, 2007. Enclosed are two copies of the Indirect Cost Negotiation Agreement for signature by an authorized official of your organization.

Please return one signed copy of the agreement to our office and retain the other for your files. Since the plan does not become effective until the agreement is signed by a duly authorized representative of the organization, please give this matter your immediate attention.

A signed copy of the negotiated agreement should be mailed to the following address:

U.S. Department of Commerce
1401 Constitution Avenue, N.W.
Office of Acquisition Management, Room 6412
Attention: Mr. Gary W. Johnson
Washington, D.C. 20230

If you should have any questions, please contact me at 202 482-1679.

Sincerely,

A handwritten signature in blue ink, appearing to read "Gary W. Johnson", is written over a circular blue ink stamp.

Gary W. Johnson
Acting Director, Grants Management Division
Office of Acquisition Management

Enclosures

INDIRECT COST NEGOTIATION AGREEMENT

ORGANIZATION: Mote Marine Laboratory, Inc.
1600 Ken Thompson Parkway
Sarasota, Florida 34236
Phone: (941) 388-4441
Fax: (941) 388-4312
info@mote.org

The indirect cost rate contained herein is for use on grants, contracts and cooperative agreements with the federal government to which OMB Circular A - 122 applies, subject to the limitations contained in the Circular and in Section II, A below. The rate was negotiated by the above named organization and the U. S. Department of Commerce in accordance with the authority contained in applicable regulations.

SECTION I: RATES - FIXED RATE WITH CARRY FORWARD PROVISIONS

Period	Rate	Base	Applicable To
01/01/07-12/31/07	78.00%	Direct Salaries and Fringes	All programs

SECTION II: GENERAL TERMS AND CONDITIONS

A. Limitations

Use of the rate contained in this agreement is subject to any statutory or administrative limitations and is applicable to a given grant, contract or cooperative agreement only to the extent that funds are available and consistent with any and all limitations of cost clauses or provisions, if any, contained therein.

Acceptance of this negotiated rate is predicated on the following conditions:

- that no costs other than those incurred by the grantee's allocation plan is included in this indirect cost pool as finally accepted and that such incurred costs are legal obligations of the grantee and allowable under the governing cost principles,
- that the same costs that have been treated as indirect costs have not been claimed as direct costs,
- that similar types of costs have been accorded consistent accounting treatment, and
- the information provided by the grantee which was used as a basis for acceptance of the rate agreed to herein is not subsequently found to be materially incomplete or inaccurate.

B. Audit

Adjustments to amounts resulting from an audit of the cost allocation plan or indirect cost rate proposal upon which the negotiation of this agreement was based will be compensated for in a subsequent negotiation.

C. Changes

The fixed rates contained in this agreement are based on the organizational structure and the accounting system in effect for the applicable fiscal year. Changes in the organizational structure or changes in the method of accounting for costs which affect the amount of reimbursement resulting from use of the rate in this agreement require the express and written approval of the authorized representative of the responsible negotiating agency. Failure on the part of the contractor or grantee to obtain such approval may result in subsequent cost disallowances.

D. Fixed Rates with Carry-forward Provisions

The fixed rates contained in this agreement are based on actual costs that were incurred during the period for which the rates apply.

E. Notification to Federal Agencies

Copies of this document may be provided by either party to other federal offices as a mean of notifying them of the agreement contained herein.

F. Special Remarks

Although the entity's actual indirect cost rate for the year is 78.33%, the entity requests a rate of 78.00%. We concur.

All future indirect cost rate proposals must contain a trend analysis which itemizes expense account line items (both direct and indirect) for at least three years. Comparisons or trends of the indirect cost rate only will cause your indirect cost proposal to be rejected, until the correctly prepared trend analysis report is received by the U.S. Department of Commerce.

The resultant rate subject to this agreement must be used for billing under grants, contracts and cooperative agreements during the fiscal year ending December 31, 2008; and was computed based on the audited financial statements of the entity, for the year ended December 31, 2007.

Acceptance of Indirect Cost Negotiation Agreement

FOR THE ORGANIZATION: Mote Marine Laboratory, Inc.



Signature

10/2/08

Date

Dena Smith

Print Name

CFO, VP administration

Title

FOR THE GOVERNMENT:



Signature

9-29-08

Date

Gary W. Johnson
Acting Director, Grants Management Division
Office of Acquisition Management



United States Department of the Interior

NATIONAL BUSINESS CENTER

Indirect Cost Services

2180 Harvard Street, Suite 430

Sacramento, CA 95815



November 8, 2012


Ms. Linda C. Grove, Assistant Chief Financial Officer
Florida Fish and Wildlife Conservation Commission
620 South Meridian Street
Tallahassee, Florida 32399-1600

Dear Ms. Grove:

Enclosed is an original copy of the Indirect Cost Negotiation Agreement for the 12-month periods ending June 30, 2013, and 2014, between the Federal Government and the Florida Fish and Wildlife Conservation Commission.

Please visit our Web site at <http://www.aqd.nbc.gov/ics> for guidance and updates on submitting indirect cost proposals. In addition, you will find helpful tools such as a completeness checklist, indirect cost and lobbying certificates, sample proposals, Excel worksheet templates, and important links to other Web sites.

Sincerely,


Deborah A. Moberly
Indirect Cost Coordinator

Enclosure

Ref: J:Florida/Ffwch023/Issue.ltr

We want to hear from you! Please let us know how we are doing in meeting your needs by taking a short survey at: <http://www.aqd.nbc.gov/survey>.

Phone: (916) 566-7111
Fax: (916) 566-7110



E-mail: ICS@nbc.gov
Internet: <http://www.aqd.nbc.gov/ics>

**State And Local Department/Agency
Indirect Cost Negotiation Agreement**

EIN: 59-3105845

Organization:

Florida Fish and Wildlife
Conservation Commission
620 South Meridian Street
Tallahassee, Florida 32399-1600

Date: November 8, 2012

Report No(s) .: 13-A-0112(13)
13-A-0113(14)

Filing Ref.:

Last Negotiation Agreement
dated March 23, 2011

The indirect cost rates contained herein are for use on grants, contracts, and other agreements with the Federal Government to which 2 CFR 225 (OMB Circular A-87) applies, subject to the limitations in Section II.A. of this agreement. The rates were negotiated by the U.S. Department of the Interior, National Business Center, and the subject organization in accordance with the authority contained in 2 CFR 225.

Section I: Rates

Type	Effective Period		Rate	Locations	Applicable
	From	To			To
Fixed Carryforward	07/01/12	06/30/13	26.72%*	All	1/
Fixed Carryforward	07/01/12	06/30/13	9.72%**	All	2/
Fixed Carryforward	07/01/13	06/30/14	37.35%*	All	1/
Fixed Carryforward	07/01/13	06/30/14	12.77%**	All	2/

1/ All programs of the Fish and Wildlife Research Institute (FWRI).

2/ All other programs except the programs of the Fish and Wildlife Research Institute (FWRI).

***Base:** Total direct costs, less capital expenditures and passthrough funds.

****Base:** Total direct salaries and wages, including fringe benefits.

Treatment of fringe benefits: Fringe benefits applicable to direct salaries and wages are treated as direct costs; fringe benefits applicable to indirect salaries and wages are treated as indirect costs.

Section II: General

Page 1 of 3

A. Limitations: Use of the rates contained in this agreement is subject to any applicable statutory limitations. Acceptance of the rates agreed to herein is predicated upon these conditions: (1) no costs other than those incurred by the subject organization were included in its indirect cost rate proposals, (2) all such costs are the legal obligations of the grantee/contractor, (3) similar types of costs have been accorded consistent treatment, and (4) the same costs that have been treated as indirect costs have not been claimed as direct costs (for example, supplies can be charged directly to a program or activity as long as these costs are not part of the supply costs included in the indirect cost pool for central administration).

B. Audit: All costs (direct and indirect, federal and non-federal) are subject to audit. Adjustments to amounts resulting from audit of the cost allocation plan or indirect cost rate proposals upon which the negotiation of this agreement was based will be compensated for in a subsequent negotiation.

C. Changes: The rates contained in this agreement are based on the organizational structure and the accounting system in effect at the time the proposals were submitted. Changes in organizational structure, or changes in the method of accounting for costs which affect the amount of reimbursement resulting from use of the rates in this agreement, require the prior approval of the responsible negotiation agency. Failure to obtain such approval may result in subsequent audit disallowance.

D. Fixed Carryforward Rate: The fixed carryforward rate is based on an estimate of the costs that will be incurred during the period for which the rate applies. When the actual costs for such period have been determined, an adjustment will be made to the rate for a future period, if necessary, to compensate for the difference between the costs used to establish the fixed rate and the actual costs.

E. Agency Notification: Copies of this document may be provided to other federal offices as a means of notifying them of the agreement contained herein.

F. Record Keeping: Organizations must maintain accounting records that demonstrate that each type of cost has been treated consistently either as a direct cost or an indirect cost. Records pertaining to the costs of program administration, such as salaries, travel, and related costs, should be kept on an annual basis.

G. Reimbursement Ceilings: Grantee/contractor program agreements providing for ceilings on indirect cost rates or reimbursement amounts are subject to the ceilings stipulated in the contract or grant agreements. If the ceiling rate is higher than the negotiated rate in Section I of this agreement, the negotiated rate will be used to determine the maximum allowable indirect cost.

H. Use of Other Rates: If any federal programs are reimbursing indirect costs to this grantee/contractor by a measure other than the approved rates in this agreement, the grantee/contractor should credit such costs to the affected programs and the approved rates should be used to identify the maximum amount of indirect cost allocable to these programs.

I. Central Service Costs: Where central service costs are estimated for the calculation of indirect cost rates, adjustments will be made to reflect the difference between provisional and final amounts.

J. Other:

1. The purpose of an indirect cost rate is to facilitate the allocation and billing of indirect costs. Approval of the indirect cost rates does not mean that an organization can recover more than the actual costs of a particular program or activity.

2. Programs received or initiated by the organization subsequent to the negotiation of this agreement are subject to the approved indirect cost rate if the programs receive administrative support from the indirect cost pool. It should be noted that this could result in an adjustment to a future rate.

3. New indirect cost proposals are necessary to obtain approved indirect cost rates for future fiscal or calendar years. The proposals are due in our office 6 months prior to the beginning of the year to which the proposed rates will apply.

Section III: Acceptance

Listed below are the signatures of acceptance for this agreement:

By the State Department/Agency:

By the Cognizant Federal Government
Agency:

Linda C. Grove /s/

Signature

Linda C. Grove

Name (Type or Print)

Assistant CFO

Title

11/2/2012

Date

Deborah A. Moberly /s/

Signature

Deborah A. Moberly

Name

Indirect Cost Coordinator

Indirect Cost Services

Title

U.S. Department of the Interior

National Business Center

Agency

Date

NOV 08 2012

Negotiated by Sujoy Mukhopadhyay

Telephone (916) 566-7009

Appendix 6. Letters of Support

**Resolution of the Florida Keys National Marine Sanctuary Advisory Council in
support of RESTORE Act and other funding for the proposal,
“Restoring Threatened Corals to Enhance Reef Functions, Fisheries Habitat and
Tourism Opportunities in the Florida Keys.”
July 9, 2013**

Whereas, the Florida Keys National Marine Sanctuary (FKNMS) was established in 1990 and represents the largest marine zoological park in the United States, and

Whereas, the legislation creating the FKNMS found that adjacent to the Florida Keys land mass are located spectacular, unique, and nationally significant marine environments, including seagrass meadows, mangrove islands, and extensive living coral reefs, and

Whereas, these natural resources are the marine equivalent of tropical rain forests in that they support high levels of biological diversity, are fragile and easily susceptible to damage from human activities, and possess high value to human beings if properly conserved, and

Whereas, More than 33,000 jobs in the Keys are supported by ocean recreation and tourism, accounting for 58% of the local economy and \$2.3 billion in annual sales, and

Whereas, ongoing degradation of coral reefs threatens to undermine the Florida Keys marine ecosystem and the economy which it supports, and

Whereas, the threat of pollution from the Deepwater Horizon oil spill impacting the marine and coastal environment of the Florida Keys was grave enough to drive some tourism and related business away from the region, and

Whereas, the RESTORE Act was passed to ensure that financial penalty funds associated with the Deepwater Horizon oil spill would be focused on restoration of the natural resources and economy of the Gulf of Mexico, and

Whereas, a RESTORE Act project proposal, “Restoring Threatened Corals to Enhance Reef Functions, Fisheries Habitat and Tourism Opportunities in the Florida Keys,” has been submitted to the Florida Department of Environmental Protection by The Nature Conservancy on behalf of the project partners who also include the Coral Restoration Foundation, Mote Marine Laboratory and the Florida Fish and Wildlife Conservation Commission, and

Whereas, if funded this coral restoration proposal would build upon more than a decade of successful coral reef restoration effort in the Florida Keys and lead to at least 14,000 corals per year for up to six years being restored to the reefs of the southern Gulf of Mexico, both enhancing the natural environment and increasing opportunities for nature tourism, now

Therefore, the FKNMS Advisory Council resolves to express strong support for the allocation of RESTORE Act funding for the proposal, “Restoring Threatened Corals to Enhance Reef Functions, Fisheries Habitat and Tourism Opportunities in the Florida Keys,” and requests that the FKNMS Superintendent send copies of this Resolution accompanied by a copy of the project fact sheet to State of Florida, NOAA and any other officials involved in the RESTORE project review and funding allocation process.



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office

263 13th Avenue South

St. Petersburg, Florida 33701-5505

<http://sero.nmfs.noaa.gov>

F/SER31:JAM

August 20, 2013

Monroe County Local Advisory Committee
Historic Gato Building
1100 Simonton Street
Key West, FL 33040

Re: Monroe County RESTORE Act Funding

The purpose of this letter is to express our strong support for the proposal submitted by The Nature Conservancy (TNC) on behalf of a consortium of coral reef restoration partners to the Monroe County Local Advisory Committee for Restore Act funds. If funded, this project will support recovery and enhance Florida's populations of staghorn coral (*Acropora cervicornis*) and two species of boulder coral: great star coral (*Montastrea cavernosa*) and mountainous star coral (*Montastrea faveolata*). Under the US Endangered Species Act, staghorn coral is currently listed as threatened but has been proposed for reclassification to endangered, and mountainous star coral is proposed for listing as endangered.

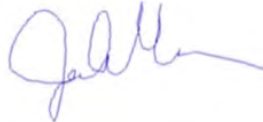
Coral habitats in the Keys have been in decline since the 1970s, due mainly to coral bleaching, disease outbreaks, harmful algal blooms, hurricanes, and anomalies in weather patterns. The loss of reproductively active colonies, increased distance between sexually mature colonies, poor recruitment rates, and limited settlement habitat have combined to create a situation in which it is unlikely that corals in the Florida Keys will repopulate the reefs naturally. This contributes to decreased resilience of the reef community and depresses natural restorative processes. Habitat protection and threat abatement are likely not enough to stop the decline of reefs and active restoration of coral species is quickly becoming a feasible and cost-effective way to reestablish live corals to reefs. As such, we have identified active population enhancement as a key recovery action for the currently-listed staghorn coral and also consider these actions necessary to provide for the conservation of other threatened corals. The proposal submitted TNC addresses both the need for increased live coral cover at individual sites and the need for increased chances of successful sexual reproduction.

In addition to the ecological significance of the project, this work will also provide economic benefits throughout the County. Most commercially and recreationally important fish species depend on healthy reef habitats for at least some portion of their life history. The world-class fishing that the Keys are famous for depends on a living reef system. Live reefs with large fish populations attract sharks, rays, sea turtles, and dolphins, which in turn attracts divers and snorkelers, another significant source of income in the Keys.



TNC and the partners involved are fully capable of producing and outplanting the numbers of corals that they have committed to following a ramp-up of nursery material under funding from NOAA. They are also well-equipped to handle the reporting and scrutiny that may accompany Restore Act funds, as they have just completed work under the similarly high-profile American Recovery and Reinvestment Act. For these reasons, we lend our full support to this proposed project, and hope it will be given every consideration for funding.

Sincerely,

A handwritten signature in blue ink, appearing to read 'J Moore', with a long horizontal flourish extending to the right.

Jennifer Moore
ESA Coral Listing and Recovery Coordinator



United States Department of the Interior
NATIONAL PARK SERVICE

Everglades and Dry Tortugas National Parks
40001 State Road 9336
Homestead, Florida 33034



June 25, 2013

Re: Restore Act

To Whom It May Concern,

I am happy to provide this letter of support for the proposal submitted by The Nature Conservancy (TNC) on behalf of a consortium of coral reef restoration partners for funding under the Restore Act. If funded, this project will continue the large-scale work started under the American Recovery and Reinvestment Act and support recovery of Florida and U.S. Caribbean populations of the staghorn (*Acropora cervicornis*) and elkhorn (*Acropora palmata*) corals, listed as threatened and recently proposed for uplisting to endangered under the Endangered Species Act (ESA).

Staghorn and elkhorn corals were once the most abundant and important species on Florida's coral reefs; however, they experienced precipitous declines in the early 1980's throughout their ranges and this decline has continued. In 1976, there were 478 hectares of staghorn dominated reefs in Dry Tortugas National Park. However, in 2008 there was less than one hectare, a loss of more than 99% of the population. The recent critical habitat designation identified the key conservation objective for the corals as facilitating increased incidence of successful sexual and asexual reproduction. The proposal submitted by TNC will directly address that conservation goal by maintaining nurseries and a series of localized thickets following the anticipated rapid growth and expansion of transplanted nursery fragments. In addition to the direct impacts of this project, these species also play an important ecological role as habitat for many commercially and recreationally important fish species.

The Nature Conservancy and their partners have proven that they can successfully create and maintain coral nurseries and transplant fragments of staghorn and elkhorn corals to depleted reef areas. By continuing the existing program within South Florida and the Caribbean, this project will enhance populations of *Acropora* spp. and facilitate their recovery. This will help to increase local biodiversity and will provide ecosystem services for various user groups, including recreational divers and snorkelers within Dry Tortugas National Park.

A great deal of momentum has been built behind this important project and we hope it continues. For these reasons, we lend our full support to this proposed project, and hope it will be given every consideration for funding.

Sincerely,

Tracy A. Ziegler, Ph.D.

Fisheries Biologist
Dry Tortugas National Park



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Restoration Center
263 13th Ave South
St. Petersburg, Florida 33701
727-551-5716

August 20, 2013

Monroe County Local Advisory Committee
11 Simonton Street
Key West, FL 33040

On behalf of NOAA's Restoration Center I wanted to thank the Monroe County for your previous support support of conservation activities. As you know coral reefs including many formerly dominant species have seen dramatic declines in recent years the low wild abundance has also led to low genetic diversity amongst the population. In order to combat these declines in both abundance and genetic diversity NOAA has partnered with the Nature Conservancy and other partners in Monroe County to actively expand our efforts to grow nursery reared corals.

The purpose of this letter is to express our strong support for the proposal submitted by The Nature Conservancy (TNC) on behalf of a consortium of coral reef restoration partners to the Monroe County Local Advisory Committee for Restore Act funds. If funded, this project will support recovery and enhance Florida's populations of staghorn coral (*Acropora cervicornis*) and two species of boulder coral: great star coral (*Montastrea cavernosa*) and mountainous star coral (*Montastrea faveolata*). Under the US Endangered Species Act, staghorn coral is currently listed as threatened but has been proposed for uplisting to endangered, and mountainous star coral is proposed for listing as endangered.

The goal of these propagation efforts is not to "restore the entire reef," but rather to help diversify the wild population and combat the effects that low populations and low genetic diversity can have on reef recovery. Even if external factors begin to be addressed and we continue to have relatively good spawning events, those efforts may be for naught; after the major coral die-off's most *Acropora* stands were left with little or no genetic diversity. Since the species is not able to self fertilize the spawn, the spawning effort is often washed out to sea with little to no successful sexual reproduction because individual corals are often no longer proximate. The goal of this project is to grow genetically diverse corals to maturity and then strategically place them on the reef to increase wild populations and genetic diversity, which will hopefully result in an increased likelihood of successful sexual reproduction events.

While on the surface this may appear to be an ecological project it has economic benefits throughout the County that will significantly outweigh the investment. Most commercially and recreationally important fish species depend on healthy reef habitats for at least some portion of their life history. The world-class fishing that the Keys are famous for depends on a living reef system. Live reefs with large fish populations attract sharks, rays, sea turtles, and dolphins, which in turn attracts divers and snorkelers, another significant source of income in the Keys.

NOAA looks forward to continuing our long-standing partnership with TNC and looks forward to working with them closely on the implementation of this project. If you have any questions please do not hesitate to contact me at 727-551-5716 or at Tom.Moore@noaa.gov.

Sincerely,

Tom Moore
Coral Restoration Coordinator





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, FL 33040

May 28, 2013

Re: RESTORE Act funding

To Whom It May Concern,

The purpose of this letter is to express our strong support for the proposal submitted by The Nature Conservancy (TNC) on behalf of a consortium of coral reef restoration partners to the NOAA Coastal and Marine Habitat Restoration Project grant program. If funded, this project will help continue the work started under the American Recovery and Reinvestment Act and support recovery of Florida and U.S. Caribbean populations of the staghorn (*Acropora cervicornis*) and elkhorn (*Acropora palmata*) corals, listed as threatened and recently proposed for uplisting to endangered under the Endangered Species Act (ESA).

Staghorn and elkhorn corals used to be the most abundant and important species on many Caribbean coral reefs; however, they experienced precipitous declines in the early 1980s throughout their ranges and this decline has continued. In the few locations where quantitative data are available, declines in abundance (coverage and colony numbers) are estimated at >97%. The recent critical habitat designation identified the key conservation objective for the corals as facilitating increased incidence of successful sexual and asexual reproduction. The proposal submitted by TNC will directly address that conservation goal by maintaining nurseries and a series of localized thickets following the anticipated rapid growth and expansion of transplanted nursery fragments. In addition to the direct impacts of this project, these species also play an important ecological role as refugia for many commercially and recreationally important fish species.

The Nature Conservancy and their partners have proven that they can successfully create and maintain coral nurseries and transplant fragments of staghorn and elkhorn corals to depleted reef areas. By continuing the existing program within South Florida and the Caribbean, this project will enhance populations of *Acropora spp.* and facilitate their recovery. This will help to increase local biodiversity and will provide ecosystem services for various user groups, including recreational divers and snorkelers. A great deal of momentum has been built behind this important project and we hope it continues. For these reasons, we lend our full support to this proposed project, and hope it will be given every consideration for funding.

Sincerely,

Sean Morton
Superintendent

